PURDUE SCHOOL OF ENGINEERING AND TECHNOLOGY 2002 ASSESSMENT REPORT

Prepared by the School's Assessment Committee and Charles F. Yokomoto, Chair

June 1, 2002

Introduction

This report represents the culmination of six years of work in outcomes assessment by the faculty of the seven degree granting departments of Purdue School of Engineering and Technology (E&T), Indianapolis, and the Technical Communications Program. Guided by the School's Assessment Committee, several of the departments have been able to close the assessment loop with this report by being able to make use of their assessment of student learning to make improvements in the teaching and learning process in their respective programs, and the others are well on their way to doing the same.

The assessment committee has been very active since its inception in the fall semester of 1996. Under the guidance of Dr. Charles Yokomoto, Professor of Electrical and Computer Engineering, the committee has met monthly. The members of the current committee are the following:

Hasan Akay, Mechanical Engineering
Tim Diemer, Organizational Leadership and Supervision
Eugenia Fernandez, Computer Technology
Patricia Fox, Organizational Leadership and Supervision and Dean's Office
Sally Frettinger-Devor, Mechanical Engineering Technology
Clifford Goodwin, Organizational Leadership and Supervision
Marjorie Rush Hovde, Technical Communications
Laura Lucas, Construction Technology
Brian King, Electrical and Computer Engineering
Nasser Paydar, Dean's Office
Richard Pfile, Electrical and Computer Engineering Technology
Ramana Pidaparti, Mechanical Engineering
Kenneth Rennels, Mechanical Engineering Technology
Erdogan Sener, Construction Technology
David Williamson, Computer Technology
Charles Yokomoto, Committee Chair, Electrical and Computer Engineering Technology
H. Öner Yurtseven, Dean

Past members of committee include the following: Maurice Bluestein (MET), David Bostwick (OLS/Emeritus), Edward Berbari (ECE), Bill Conrad (EET),Yaobin Chen (ECE), Stanley Chien (ECE), Jie Chen (ME), Stephen Hundley (OLS), Tom Ho (CPT), Razi Nalim (ME), Marvin Needler (EET), Mike O'Dea (CNT), John O'Loughlin (ME/Emeritus), Jose Ramos (ECE), Kenneth Reid (EET)., Maher Rizkalla (ECE), and Harriet Wilkins (TCM). All told, thirty-four members of the faculty of E&T have served on the committee, and several have long records of participation. In addition, David Williamson, Cliff Goodwin, and David have served as members of the assessment steering committee.

A Shared Understanding of Outcomes Assessment With Individualized Processes

As reported in our 2001 Annual Report, the departments in the school have developed a shared understanding of the assessment process and have adopted common principles and terminology. However, the chair of the committee encouraged each department to determine its own particular approach to outcomes assessment. In this way, departments could tailor their process to match the organizational personality of its faculty, the accreditation requirements of its degree programs, and the characteristics of its degree programs. This decision was influenced by three major factors: (1)

differences in accreditation requirements for the various departments, (2) differences in curricula, and (3) differences in faculty perceptions of how assessment can be carried out efficiently.

Table 1, taken from our School's 2001 annual report and updated to current times, characterizes the differences in the assessment plans of the seven departments. Column 2 of the table describes the whether a department's process is based on its professional accreditation of the IUPUI Principles of Undergraduate Learning (PUL). Two of the departments must satisfy the outcomes assessment requirements for their professional accreditation and have elected to be guided by the engineering accreditation criteria of the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET/EAC), four by the by the technology accreditation criteria of the Technology Accreditation Commission of ABET (ABET/TAC), and one has chosen to be guided by the IUPUI Principles of Undergraduate Learning (PUL)

Table 1. Characterization of Departmental Assessment Processes.

Department	Basis	Primary Strategy	Supplemental Sources of Assessment Data
Computer Technology (CPT)	ABET/TAC	Assessment in selected courses that cover the department's outcomes	Student self reports of well they feel they have learned the course outcomes using surveys Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction using in-house survey Alumni satisfaction Employer satisfaction
Construction Technology (CNT)	ABET/TAC	Assess actual learning in all courses taught by full-time faculty and selected courses taught by associate faculty. Each course is assigned one or more of the department's outcomes for assessment.	Student self reports of well they feel they have learned the course outcomes using surveys Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction
Electrical and Computer Engineering (ECE)	ABET/EAC	Assess selected courses with strong emphasis on the senior capstone design course and the senior ethics course.	Focus group discussion with seniors Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction using in-hours survey Alumni satisfaction Employer satisfaction
Electrical Engineering Technology (EET)	ABET/TAC	Assess how well students feel they have learned the course objectives/ outcomes using surveys	Continuing students satisfaction Senior capstone project Student works in selected courses Retention rates, graduation rates, and number of degrees conferred Alumni satisfaction Employer satisfaction
Mechanical Engineering (ME)	ABET/EAC	Assess student self reports of confidence in the course outcomes	Capstone design course Student works (artifacts) in selected courses Student self reports of well they feel they have learned the course outcomes using surveys Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction Exit interview
Mechanical Engineering Technology (MET)	ABET/TAC	Assess actual learning through comprehensive exam or portfolio,	Student works (artifacts) in selected courses Student self reports of well they feel they have learned the course outcomes using surveys

		depending on the degree program	Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction
Organizational Leadership and Supervision (OLS)	PUL	Assess actual learning in selected courses, including the required senior research project course	Graduating senior survey Passing rate on certificate program Retention rates, graduation rates, and number of degrees conferred Continuing students satisfaction Alumni satisfaction Employer satisfaction

For accreditation, engineering faculty and technology faculty must demonstrate student accomplishment of eleven learning outcomes. The EAC and TAC outcomes are similar but not the same, and the relate quite will to the PULs. Rather than developing a complex outcomes assessment process where both the ABET outcomes and PUL outcomes are assessed, the ABET directed programs have chosen a strategy of assessing the ABET outcomes and demonstrating through a relational matrix that the eleven ABET outcomes give good coverage of the PULs.

Demonstrating the Relationship Between ABET Accreditation and the PULs

To show that the eleven ABET outcomes for EAC and for TAC map into the PULs, two tables were developed, Table 2 for engineering programs and Table 3 for technology programs. The engineering mapping differs slightly from the technology matrix in that it demonstrates the quality of the linkage, rating the linkage as strong, moderate, or mild. Both tables show that the eleven ABET outcomes adequately cover the PULs.

Web Sites that Describe Our Assessment Processes

Further information on our assessment processes can be found on the Web. Power Point slide shows that describe the outcomes assessment process of the Mechanical Engineering Department by Hasan Akay, the Organizational Leadership and Supervision Department by Cliff Goodwin, and the School of Engineering and Technology by Charlie Yokomoto can be viewed at http://www.planning.iupui.edu/prac/minutes/2001-2002/PRAC%20Presentations/dec01/Akay_ME_Dec_files/v3_document.htm (ME), http://www.planning.iupui.edu/prac/minutes/2001-2002/PRAC%20Presentations/dec01/Engin_Goodwin_Dec_files/v3_document.htmand (OLS), and http://www.planning.iupui.edu/prac/minutes/2001-2002/PRAC%20Presentations/dec01/Akay_ME_Dec_files/v3_document.htm (E&T). If you should lose these two URLs, you may find your way to the two web sites by going to http://www.planning.iupui.edu, clicking PRAC and finding your way to the December 2001 minutes.

Findings and Improvements

In our 2000 annual report, we presented a summary table of findings, and our 2001 report presented a summary table of improvements. This year, because of the fullness of the departmental reports, we leave the reader to look at each department's reports for current information on assessment findings and improvements.

TABLE 2. PULS COVERED BY ABET/EAC CRITERION 3, ITEMS A-K

Created by David Bostwick, Oct. 15, 1999

Revised by Hasan Akay and Charlie Yokomoto, May 21, 2002

3 = strong linkage, 2 = moderate linkage, 1 = mild linkage

ABET/EAC CRITERIA #3, items a through k	PULs COVERED BY THE ABET/EAC a-k																					
	PUL 1					PUL 2					PUL 3			PUL 4			PUL 5			PUL 6	
	Core Communication and Quantitative Skills					Critical Thinking					Integration and Application of Knowledge			Intellectual Depth, Breadth, and Adaptiveness			Understand Society and Culture			Values and Ethics	
	a	b	c	d	e	a	b	c	d	e	a	b	c	a	b	c	a	b	c	a	b
(a) - An ability to apply knowledge of mathematics, science and engineering				3		2	2		2	2	2	3	2	3	2						
(b) - An ability to design and construct experiments as well as to analyze and interpret data						3	3	3	2			2		3	1	2					
(c) - An ability to design a system, component, or process to meet desired needs						2	2	3	3	1	3	2	3	3		3					
(d) - An ability to function on multi-disciplinary teams			2												1	3			2		
(e) - An ability to identify, formulate and solve engineering problems		2		3		3	3	3	3	3	3	3	3	3	1	2					
(f) - An understanding of professional and ethical responsibility						2	3					2	1		3	2	1	1	2	3	1
(g) - An ability to communicate effectively	3		3																		
(h) - The broad education necessary to understand the impact of engineering solutions in global societal context											1	2	2			2	2	2		2	
(i) - A recognition of the need for and an ability to engage in life-long learning		3			2		2														
(j) - A knowledge of contemporary issues		2								1					1			2			2
(k) - An ability to use the techniques, skill and modern engineering tools necessary for engineering practice					3							3	2	3							

PULS OVERED BY ABET/EAC CRITERION 3, ITEMS A-K

Created by David Bostwick, Oct. 15, 1999

Revised by Laura Lucas, Eugenia Fernandez, Ken Rennels, Rich Pfile, and Charlie Yokomoto, Dec. 2001

ABET OUTCOMES ***TAC CRITERIA #1 items (a) to (k)***	**PRINCIPLES OF UNDERGRADUATE LEARNING ADDRESSED**																				
	# ONE					**# TWO**					**# THREE**			**# FOUR**			**# FIVE**			**# SIX**	
	Core Communication and Quantitative Skills					Critical Thinking					Integration and Application of Knowledge			Intellectual Depth, Breadth, and Adaptiveness			Understand Society and Culture			Values and Ethics	
	a	**b**	**c**	**d**	**e**	**a**	**b**	**c**	**d**	**e**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**	**c**	**a**	**b**
(a) - Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline				⑨	⑨							⑨		⑨							
(b) – Apply current knowledge and adapt to emerging applications in mathematics, science, engineering and technology						⑨	⑨		⑨	⑨			⑨	⑨		⑨					
(c) - Conduct, analyze and interpret experiments and apply experimental results to improve processes		⑨				⑨		⑨		⑨				⑨							
(d) – Apply creativity in the design of systems, components or processes appropriate to program objectives							⑨		⑨				⑨	⑨		⑨					⑨
(e) – Function effectively on teams			⑨																⑨		
(f) - Identify, analyze and solve technical problems		⑨		⑨		⑨	⑨	⑨	⑨					⑨		⑨					
(g) - Communicate effectively	⑨		⑨								⑨								⑨		
(i) - Understand professional, ethical and societal responsibilities						⑨						⑨						⑨		⑨	
(j) - Recognize contemporary professional, societal and global issues and be aware of and respect diversity										⑨		⑨	⑨		⑨		⑨	⑨	⑨	⑨	
(k) - Have a commitment to quality, timeliness and continuous improvement					⑨					⑨	⑨					⑨				⑨	

Department Reports

This year, the departments agreed to base their reports on the assessment table (matrix) distributed by the Program Review and Assessment Committee (PRAC) with a few modifications added to make the document more complete.

Attachment A: Computer Technology
Attachment B: Construction Technology
Attachment C: Electrical and Computer Engineering
Attachment D: Electrical and Computer Engineering Technology
Attachment E: Mechanical Engineering
Attachment F: Mechanical Engineering Technology
Attachment G: Organizational Leadership and Supervision

DEPARTMENT OF COMPUTER TECHNOLOGY 2002 ASSESSMENT REPORT

Prepared by Eugenia Fernandez, David Williamson, and the Faculty of the Department

May 16, 2002

History

1995-96: The E&T Assessment Committee engaged in lengthy discussions on possible approaches to carrying out its assessment responsibilities. By the end of the year, the committee agreed, in spirit, to model its plan after the plan developed at Rose-Hulman Institute of Technology, modified to suit the particulars of our school.

1996-97: E&T Assessment Committee revised its plan, building upon the plan developed at the Rose-Hulman Institute of Technology

1997-98: CPT Department developed statements of mission, goals, and objectives.

Departments start work on learning objectives at the course level for the Spring semester.

1998-99 The School begins collecting assessment data from each department.

Assessment artifacts are collected from 3 CPT courses.

1999-00 CPT department starts identifying which ABET TAC outcomes each CPT course addressed and writing Measurable Learning Outcomes and Course Instructional Objectives for each course. 17 of 38 courses are completed.

Assessment artifacts collected from 4 CPT courses.

2000-01 CPT department continues to identify the ABET TAC outcomes, Measurable Learning Outcomes and Course Instructional Objectives for each course. 35 of our 40 courses were completed.

CPT department works with our Industrial Advisory Committee to write Measurable Learning Outcomes for each of the ABET TAC Criteria.

Assessment artifacts collected from 3 more CPT courses.

2001-02 CPT completes its work on identifying ABET TAC outcomes, Measurable Learning Outcomes and Course Instructional Objectives for each course, and start work on a process to include this information on the Web-based summary page for each course.

18 sets of assessment artifacts collected from CPT courses.

Our Assessment Process

The CPT Department decided to use the ABET TAC Criterion as the basis for their assessment efforts. Measurable Learning Outcomes (MLO) were developed for each criterion. For most of the MLOs, assignments which address the MLO were selected for assessment. The artifacts were collected and assessed. Results were then tabulated and are presented in the tables. By addressing the set of ABET TAC Criteria, the CPT Department believes that the Principles of Undergraduate Learning are also assessed, as exemplified in the attached ABET/PUL matrix.

This process will continue in future. However, to ensure that all MLOs are assessed, especially for the A.S. degree, the CPT Department plans to use the Assessment Checklist developed by Professor Laura Lucas in Construction Technology. This checklist transforms the above mentioned process into a series of easily followed action items. At the beginning of each semester, each full-time or Associate Faculty will be assigned one MLO to assess following this checklist. Use of this checklist will enable us to expand our coverage of the MLOs, to include our Associate Faculty in the assessment process, and will streamline the collection of assessment data.

Other Information

In Fall 1997 the CPT department revised the computer math requirements for CPT majors. The Computer Applications in Finite Math course was replaced with a new Quantitative Analysis I course (QA1). QA1 was designed as a first semester course intended to teach students "qualitative and quantitative problem solving featuring a systems approach that relies on graphic models to describe such concepts as relations, sequences, and logic patterns". Its goal is to provide students with the quantitative skills that are used in second and third semester CPT courses. In Spring 2002, Professor Fernandez completed a study of the effect of the CPT 120 Quantitative Analysis I (QA1) prerequisite on performance in the subsequent introductory programming course, CPT 140. Analysis of data gathered from the Spring 2000 semester indicate that the prerequisite course made a difference in CPT 140 performance for students with less than 65 credit hours, the equivalent of two years of college study. This suggests that the QA1 prerequisite is more beneficial for associate level students than it is for students who have more than two years of college credit. Since the placement of the quantitative analysis course in the curriculum is focused on second semester (or entering) students, these results support the current curriculum structure in the CPT department.

In Fall 2000, the CPT Department joined the TechWizards program coordinated by the Indiana Youth Institute (IYI). In this alliance, IYI subsidizes IT projects for youth-serving non-profit organizations in Indiana. These projects are completed by CPT students under the supervision of a CPT faculty member. To date, 22 projects have been completed, all with positive results.

CPT OUTCOMES ASSESSMENT REPORT TABLE FOR
Associate of Science Degree Program 2001-2002

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (a) : Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline.	a1. Explain the terminology and basic concepts of information technology.	CPT 115	Lecture	Comprehensive Final	Only 61% of students in CPT 115 scored 80% or more on the final.	The course is being redesigned to use short lectures utilizing active learning techniques in conjunction with the completion of small projects.	

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	a2. Demonstrate a proficient level of competency in word processing, spreadsheet, database, graphical presentation, Internet browser and Web publishing software.	CPT 106 CPT 223	A combination of lecture, hands-on exercises and integrative project work are used in both these course.	Course Grade	Only 69% of the students in CPT 106 earned a C or better grade. 87% of the students in CPT 223 earned a C or better grade.	In collaboration with University College, a student tutoring program, led by previous CPT 106 students, was implemented. An online Skills Assessment Manager was used to test student proficiency in the software. This tool also provides practice tests for students. Web design concepts were eliminated from CPT 106 since they are taught in CPT 223. This provides students with more time to study the other applications. Coverage of vocabulary and basic computer concepts was added to the course.	More peer tutoring/mentoring programs.

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	a3. Demonstrate mastery of general object oriented concepts.	CPT 254	Lecture, homework, individual and group project work.	Completion of a homework assignment requiring application of OO concepts.	90% of the students earned 75% or more on the assignment.		
	a4. Demonstrate mastery of systems development methodologies.	CPT 254	Lecture, homework, individual and group project work.	Completion of a homework assignment on a system development technique.	Only 32% of the students earned a 75% or better on the assignment.	In the last year, the course was changed to focus on object oriented (OO) development concepts. For next year, the textbook was changed to one which better explains OO concepts. Assignments have been structured as a series of small interrelated components.	
	a5. Write a program using an object oriented programming language.	CPT 262	A mixture of lecture, small group work and labs. Students complete 7 labs and 5 programs.	Completion of an object-oriented program.	85% of the students earned 75% or better on the program.		
ABET TAC Outcome (b): Apply current knowledge and adapt to emerging applications in	b1. Apply systems theory, logic & statistics, and object oriented to problem solving and decision making.	CPT 220	Lecture & readings.	Lab Assignment	89% of the students earned 75% or better on this assignment.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
technology.	b2. Design a logical data model for a given application.	CPT 288	Students reverse engineer the database for a website.. Lecture and homework assignments on data modeling.	Completion of OR modeling homework assignment.	86% of the students earned 75% or better on this assignment.		
	b3. Create, manipulate and maintain database systems.	CPT 288	Demonstration of database usage and SQL. Student complete cases studies using a database system, and write queries using SQL in Oracle.	Students create a database application using Microsoft Access. study SQL Exam	Less than 70% of the students earned 75% or more on this assignment and exam.	Instituted a series of SQL quizzes. Created more homework assignments on SQL. Switched to a book which better emphasizes database relationships and uses case study examples.	
	b4. Transfer current knowledge to new technologies such as new or different software applications						
	b5. Be able to decompose large complex problems into subsystems.	CPT 254	Students work on case studies.	Use Case Analyses	81% of the students earned 75% or more on their assignment.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	b6. Be able to synthesize abstract subsystem solutions into an overall solution						
ABET TAC Outcome (c): Conduct, analyze, interpret and document testing experiments and apply experimental results to improve processes.	c1. Use programming logic, critical thinking and debugging skills in hardware and software troubleshooting.	CPT 233	Lecture. Students complete a series of labs related to hardware and software troubleshooting..	Exam Questions	96% of the students earned 75% or more on this subset of exam questions.		
	c2. Use statistical techniques to perform analysis to determine the reliability and performance of system components.						
	c3. Conduct usability tests of an application and apply the results in revising the application.						
	c4. Check system requirements against user needs.	CPT 254	Individual and group work exercises.	Students describe system requirements using CRC method.	75% of the students earned 75% or better on this assignment.		
ABET TAC Outcome (d):	d1. Model a process in systems terms.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Apply creativity in the design of systems, components or processes appropriate to program objectives.	d2. Create analysis and design deliverables for information technology applications.	CPT 254	Individual and group work exercises.	Students write a Design Specification Report.	In 254, only 30% of the student groups scored above a 3 (on a 1-5 scale) on the Critical Thinking Holistic Rubric.	Course has been changed to use object-oriented analysis & design techniques only. Replaced one large deliverable with a series of smaller components.	
	d3. Integrate industry standard components into the design of a comprehensive computer solution	CPT 140	Lecture and numerous programming homework assignments.	Students produce a fully documented "run book" for a program.	80% of the students scored above a 3 (on a 1-5 scale) on the Holistic Mastery Rubric.		
ABET TAC Outcome (e): Function effectively on teams.	e1. Effectively work within a team environment to accomplish project tasks.						
	e2. Demonstrate a working knowledge of essential teamwork skills						
	e3. Realistically self-evaluate their ability to work in teams at a satisfactory level						
	e4. Demonstrate conflict resolution skills.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (f): Identify, analyze, and solve technical problems.	f1. Design and implement backup & recovery strategies for a system.						
	f2. Apply a problem solving protocol to the solution of technical problems.						
	f3. Document technical problems and their attempted solutions.						
ABET TAC Outcome (g): Communicate effectively.	g1. Prepare professional reports to communicate project findings & recommendations to a target audience.	TCM 220	Writing assignments.	Students write technical report in 220..	In TCM 220, no student work earned scores >3.5 (on 1-5 scale) on the "Criteria for Assessing Students' Workplace Writing Abilities" rubric except on organization and length.	Add more writing assignments in lower division courses.	Emphasize basic writing competency. Develop a Writing Across the Curriculum to help faculty learn to incorporate more writing in their classes
	g2. Write reports that document the steps and procedures for implementing a given system.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	g3. Adapt written and oral communications to target audiences including those outside the profession. g4. Make a clear, concise, well-paced formal presentation.	TCM 220		Oral presentation.	Students scored >= 3.5 (on 1-5 scale) on all items on the "Criteria for Assessing Students' Workplace Speaking Abilities" rubric except for content, assumptions and conclusions.	More emphasis will be placed on these items in the TCM 220 course. Add more oral presentations to CPT content courses.	Develop Writing and Speaking Across the Curriculum programs to help faculty learn to incorporate more writing and speaking opportunities in their classes.
	g5. Demonstrate effective listening skills.						
ABET TAC Outcome (h): Recognize the need for and possess the ability to pursue lifelong learning.	h1. Subscribe to and read several technical journals.					Survey graduating seniors (a planned improvement).	These items need to be covered in the annual Alumni Survey.
	h2. Research current and emerging technologies.						
	h3. Obtain advanced degrees						
	h4. Attend continuing education workshops and courses, regardless of discipline.						
	h5. Obtain professional certifications and licensures.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (i): Understand professional, ethical and societal responsibilities.	i1. Identify the professional and ethical standards that govern information technology.						
	i2. Become active members of local community, professional or otherwise.	TechWizards program , NPower Inoculation Project	Industry-supported projects	Project completion and # of volunteers.	22 students completed IT projects for youth-serving non-profit organizations through the TechWizards program. 30 students volunteered for NPower's non-profit Inoculation Project.		
ABET TAC Outcome (j): Recognize contemporary professional, societal and global issues and be aware of and respect diversity.	j1. Discuss the impact of computer technologies on society through examination of various legal, international, social, and commercial issues.						
	j2. Explain design issues sensitive to the needs of disabled users.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (k): Have a commitment to quality, timeliness and continuous improvement.	k1. Identify and incorporate quality into production and service oriented systems.						
	k2. Assume technical leadership or coordinating role in courses.						
	k3.Identify personal and professional goals and develop plans of action to achieve them						

CPT OUTCOMES ASSESSMENT REPORT TABLE FOR
Bachelor of Science Degree Program 2001-2002

1. What general outcomes are you seeking?	**2. Measurable Outcomes: What will the student know or be able to do?**	**3a. Where will your students learn it?**	**3b. Methods**	**4. How do you measure each of the desired behaviors listed in column 2?**	**5. What are the assessment findings?**	**6. What improvements (and changes) have you made based on assessment findings?**	**7. What are the implications at the campus level?**
ABET TAC Outcome (a) : Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline.	a1. Explain the terminology and basic concepts of information technology.	CPT 115 CPT 307	Lecture	Comprehensive Final	Only 61% of students in CPT 115 scored 80% or more on the final. 80% of students in CPT 307 scored 80% or more on the final.	The course is being redesigned to use short lectures utilizing active learning techniques in conjunction with the completion of small projects.	None

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	a2. Demonstrate a proficient level of competency in word processing, spreadsheet, database, graphical presentation, Internet browser and Web publishing software.	CPT 106 CPT 223	A combination of lecture, hands-on exercises and integrative project work are used in both these course.	Course Grade	Only 69% of the students in CPT 106 earned a C or better grade. 87% of the students in CPT 223 earned a C or better grade.	In collaboration with University College, a student tutoring program, led by previous CPT 106 students, was implemented. An online Skills Assessment Manager was used to test student proficiency in the software. This tool also provides practice tests for students. Web design concepts were eliminated from CPT 106 since they are taught in CPT 223. This provides students with more time to study the other applications. Coverage of vocabulary and basic computer concepts was added to the course.	More peer tutoring/mentoring programs.

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	a3. Demonstrate mastery of general object oriented concepts.	CPT 254	Lecture, homework, individual and group project work.	Completion of a homework assignment requiring application of OO concepts.	90% of the students earned 75% or more on the assignment.		
	a4. Demonstrate mastery of systems development methodologies.	CPT 254	Lecture, homework, individual and group project work.	Completion of a homework assignment on a system development technique.	Only 32% of the students earned a 75% or better on the assignment.	In the last year, the course was changed to focus on object oriented (OO) development concepts. For next year, the textbook was changed to one which better explains OO concepts. Assignments have been structured as a series of small interrelated components.	
	a5. Write a program using an object oriented programming language.	CPT 262	A mixture of lecture, small group work and labs. Students complete 7 labs and 5 programs.	Completion of an object-oriented program.	85% of the students earned 75% or better on the program.		
ABET TAC Outcome (b): Apply current knowledge and adapt to emerging applications in	b1. Apply systems theory, logic & statistics, and object oriented to problem solving and decision making.	CPT 220	Lecture & readings.	Lab Assignment	89% of the students earned 75% or better on this assignment.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
technology.	b2. Design a logical data model for a given application.	CPT 288	Students reverse engineer the database for a website.. Lecture and homework assignments on data modeling.	Completion of OR modeling homework assignment.	86% of the students earned 75% or better on this assignment.		
	b3. Create, manipulate and maintain database systems.	CPT 288	Demonstration of database usage and SQL. Student complete cases studies using a database system, and write queries using SQL in Oracle.	Students create a database application using Microsoft Access. study SQL Exam	Less than 70% of the students earned 75% or more on this assignment and exam.	Instituted a series of SQL quizzes. Created more homework assignments on SQL. Switched to a book which better emphasizes database relationships and uses case study examples.	
	b4. Transfer current knowledge to new technologies such as new or different software applications	CPT 499 Human Computer Interaction	Students learn good design guidelines, through lecture and reading, and then apply these guidelines to the evaluation of a web site.	Heuristic Analysis Assignment	81% of the students earned 80% or better on this assignment.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	b5. Be able to decompose large complex problems into subsystems.	CPT 254 CPT 313	Students work on case studies in 254. In 313, students work with a small business client to develop a working web site for them.	Use Case Analyses	Over 75% of the students earned 80% or more on their assignments.		
	b6. Be able to synthesize abstract subsystem solutions into an overall solution						
ABET TAC Outcome (c): Conduct, analyze, interpret and document testing experiments and apply experimental results to improve processes.	c1. Use programming logic, critical thinking and debugging skills in hardware and software troubleshooting.	CPT 233	Lecture. Students complete a series of labs related to hardware and software troubleshooting..	Exam Questions	96% of the students earned 75% or more on this subset of exam questions.		
	c2. Use statistical techniques to perform analysis to determine the reliability and performance of system components.	CPT 320	Lecture.	March Madness Exercise	100% of the students earned 80% or more on this assignment.		
	c3. Conduct usability tests of an application and apply the results in revising the application.	CPT 499 Human Computer Interaction	After lecture and examples, students conduct a usability test of a web site following good practices..	Usability Test Report	75% of the students earned 80% or more on this assignment.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	c4. Check system requirements against user needs.	CPT 254	Individual and group work exercises.	Students describe system requirements using CRC method.	75% of the students earned 75% or better on this assignment.		
ABET TAC Outcome (d): Apply creativity in the design of systems, components or processes appropriate to program objectives.	d1. Model a process in systems terms.						
	d2. Create analysis and design deliverables for information technology applications.	CPT 254 CPT 374 CPT 384	Individual and group work exercises.	Students write a Design Specification Report. In 374 and 384, this is a single report compiled from work by the entire class.	In 254, only 30% of the student groups scored above a 3 (on a 1-5 scale) on the Critical Thinking Holistic Rubric. In 384, the class earned an A- on their group report. In 374 the class earned a B on their group report.	The 254 course has been changed to use object-oriented analysis & design techniques only. Replaced one large deliverable with a series of smaller components.	
	d3. Integrate industry standard components into the design of a comprehensive computer solution	CPT 140	Lecture and numerous programming homework assignments.	Students produce a fully documented "run book" for a program.	80% of the students scored above a 3 (on a 1-5 scale) on the Holistic Mastery Rubric.		
ABET TAC Outcome (e): Function effectively on teams.	e1. Effectively work within a team environment to accomplish project tasks.	CPT 374	Readings, in-class team-building exercises, required teamwork in class.	Peer evaluations	82% of the students scored above a 3 (on a 1-5 scale) on their peer evaluations.		
	e2. Demonstrate a working knowledge of essential teamwork skills	CPT 374	Readings, in-class team-building exercises, required teamwork in class.	Teamwork Survey	82% of the students scored above a 3 (on a 1-5 scale) on the Teamwork Rubric.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	e3. Realistically self-evaluate their ability to work in teams at a satisfactory level	CPT 374	Readings, in-class team-building exercises, required teamwork in class.	Teamwork Survey	82% of the students scored above a 3 (on a 1-5 scale) on the Teamwork Rubric..		
	e4. Demonstrate conflict resolution skills.						
ABET TAC Outcome (f): Identify, analyze, and solve technical problems.	f1. Design and implement backup & recovery strategies for a system.						
	f2. Apply a problem solving protocol to the solution of technical problems.	CPT 426	Lecture, readings, and labs.	Final Lab	90% of the students earned 80% or more on this lab.		
	f3. Document technical problems and their attempted solutions.	CPT 402	Lecture, readings and labs.	Wiring Lab	75% of the students earned 80% or more on this lab.		

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (g): Communicate effectively.	g1. Prepare professional reports to communicate project findings & recommendations to a target audience.	TCM 220 CPT 374 CPT 410	Writing assignments.	Students write technical report in 220, a group project report in 374 and case study analyses in 410.	In TCM 220, no student work earned scores >3.5 (on 1-5 scale) on the "Criteria for Assessing Students' Workplace Writing Abilities" rubric except on organization and length. In CPT 410, 83% of the students scored an average of 4 (on 1-4 scale) on the Holistic Writing Rubric. In CPT 374, the class group report earned a B on their report.	Add more writing assignments in lower division courses.	Emphasize basic writing competency. Develop a Writing Across the Curriculum to help faculty learn to incorporate more writing in their classes
	g2. Write reports that document the steps and procedures for implementing a given system.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	g3. Adapt written and oral communications to target audiences including those outside the profession. g4. Make a clear, concise, well-paced formal presentation.	TCM 220		Oral presentation.	Students scored >= 3.5 (on 1-5 scale) on all items on the "Criteria for Assessing Students' Workplace Speaking Abilities" rubric except for content, assumptions and conclusions.	More emphasis will be placed on these items in the TCM 220 course. Add more oral presentations to CPT content courses.	Develop Writing and Speaking Across the Curriculum programs to help faculty learn to incorporate more writing and speaking opportunities in their classes.
	g5. Demonstrate effective listening skills.						
ABET TAC Outcome (h): Recognize the need for and possess the ability to pursue lifelong learning.	h1. Subscribe to and read several technical journals.					Survey graduating seniors.	These items need to be covered in the annual Alumni Survey.
	h2. Research current and emerging technologies.						
	h3. Obtain advanced degrees						
	h4. Attend continuing education workshops and courses, regardless of discipline.						
	h5. Obtain professional certifications and licensures.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (i): Understand professional, ethical and societal responsibilities.	i1. Identify the professional and ethical standards that govern information technology.	CPT 410	Case studies and discussion	Students develop a Personal Code of Ethics tied to industry ethical standards.	80% of the students scored a 4 average (on a 1-4 scale) on the Holistic Critical Thinking Rubric.		
	i2. Become active members of local community, professional or otherwise.	TechWizards program , NPower Inoculation Project	Industry-supported projects	Project completion and # of volunteers.	22 students completed IT projects for youth-serving non-profit organizations through the TechWizards program. 30 students volunteered for NPower's non-profit Inoculation Project.		
ABET TAC Outcome (j): Recognize contemporary professional, societal and global issues and be aware of and respect diversity.	j1. Discuss the impact of computer technologies on society through examination of various legal, international, social, and commercial issues.						
	j2. Explain design issues sensitive to the needs of disabled users.						

1. What general outcomes are you seeking?	2. Measurable Outcomes: What will the student know or be able to do?	3a. Where will your students learn it?	3b. Methods	4. How do you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
ABET TAC Outcome (k): Have a commitment to quality, timeliness and continuous improvement.	k1. Identify and incorporate quality into production and service oriented systems.						
	k2. Assume technical leadership or coordinating role in capstone courses.						
	k3.Identify personal and professional goals and develop plans of action to achieve them						

CPT Assessment Summary: Fall 1998 - Spring 2002

ABET	MLO	Measured in which class?	Measured by	Measured When	Outcome Target	# Meeting Outcome	N	%	Meets Goal?	Improvement Plan	Degree Program
a. Mastery of Discipline											
	a1. Terminology	CPT 115	Comprehensive Final	Fall 2000	70% > 80%	19	31	61%	**NO**		AS
	a1. Terminology	CPT 307	Comprehensive Final	Fall 2001	70% > 80%	39	49	80%	Yes	continuous improvement	AS
	a2. Software Proficiency	CPT 106 LC	Course Grade	Fall 2001	70% > C	11	16	69%	**NO**		AS
	a2. Software Proficiency	CPT 223	Course Grade	Fall 2001	70% > C	124	143	87%	Yes	continuous improvement	AS
	a3. OOP concepts	CPT 254	Homework Assignment	Spring 2002	70% > 75%	69	71	97%	Yes	continuous improvement	AS
	a4. Systems Dvlpmnt	CPT 254	DFD Quiz	Spring 2002	70% > 70%	23	72	32%	**NO**	switched to object-oriented assignments	AS
	a5. OOP Program	CPT 262	Programming Assigment	Spring 2002	70% > 75%	23	27	85%	Yes	continuous improvement	AS
b. Apply Knowledge											
	b1. Prblm Solvg/Decsn Making	CPT 220	Lab Assignments	Spring 2002	70% > 75%	34	38	89%	Yes	continuous improvement	AS
	b2. Logical data model	CPT 288	OR Diagrams	Spring 2002	70% > 75%	50	58	86%	Yes	continuous improvement	AS
	b3.Create/Use database	CPT 288	Access Homework	Spring 2002	70% > 75%	37	57	65%	**NO**		AS
	b3.Create/Use database	CPT 288	SQL Exam	Spring 2002	70% > 75%	29	57	51%	**NO**		AS
	b4. Transfer knowledge	CPT 499 HCI	Heuristic Analysis	Spring 2002	75% > 80%	13	16	81%	Yes	continuous improvement	BS
	b5. Problem Decomposition	CPT 313	Use Case Analysis	Spring 2002	75% > 80%	41	54	76%	Yes	continuous improvement	BS
	b5. Problem Decomposition	CPT 254	Use Case Analysis	Spring 2002	70% > 75%	58	72	81%	Yes	continuous improvement	AS
	b6. Synthesize Solution										
c. Improve Process											
	c1. Troubleshooting	CPT 233	Exam Questions	Spring 2002	70% > 75%	27	28	96%	Yes	continuous improvement	AS
	c2. Analysis of Systems	CPT 320	March Madness Lab	Spring 2002	75% > 80%	27	27	100%	Yes	continuous improvement	BS
	c3. Usability	CPT 499 HCI	Usability Test Report	Spring 2002	75% > 80%	12	16	75%	Yes	continuous improvement	BS
	c4. Requirements Specs	CPT 254	CRC Requirements	Spring 2002	70% > 75%	55	72	76%	Yes	continuous improvement	AS
d. Apply Creativity											
	d1. System Model										
	d2. Analysis & design deliverables	CPT 254	Design Specification Report	Spring 1999	70% > 3	3	10	30%	**NO**	switched to OOAD, broke assignment into multiple components	AS
	d2. Analysis & design deliverables	CPT 374	Requirements Report	Fall 2001	B or better	1 (B)	1	100%	Yes	continuous improvement	BS
	d2. Analysis & design deliverables	CPT 384	Design Specification Report	Spring 2002	B or better	1 (A-)	1	100%	Yes	continuous improvement	BS
	d3. Integrate components	CPT 140	Run Books	Spring 1999	70% > 3	4	5	80%	Yes	continuous improvement	AS
e. Teamwork											
	e1. Effective Team Member	CPT 374	Peer Evaluations	Fall 2000	70% > 3	27	33	82%	Yes	continuous improvement	BS
	e2. Know Teamwork skills	CPT 374	Survey	Fall 2000	70% > 3	27	33	82%	Yes	continuous improvement	BS
	e3. Self-evaluation	CPT 374	Survey	Fall 2000	70% > 3	27	33	82%	Yes	continuous improvement	BS
	e4. Conflict Resolution										

CPT Assessment Summary: Fall 1998 - Spring 2002

ABET	MLO	Measured in which class?	Measured by	Measured When	Outcome Target	# Meeting Outcome	N	%	Meets Goal?	Improvement Plan	Degree Program
f. Solve Technical Problems											
	f1. Backup & Recovery										
	f2. Apply protocol	CPT 426	Lab Exam	Spring 2002	75% > 80%	27	30	90%	Yes	continuous improvement	BS
	f3. Documentation	CPT 402	Lab	Spring 2002	75% > 80%	15	20	75%	Yes	continuous improvement	BS
g. Communicate effectively											
	g1. Project Reports	CPT 374	Project Report	Fall 2001	B or better	1	1	100%	Yes	continuous improvement	BS
	g1. Project Reports	CPT 410	Case Study Reports	Spring 2001	80% = 4	40	48	83%	Yes	continuous improvement	BS
	g1. Project Reports	TCM 220	Technical Reports		70% > 3.5 on all items	11	14	N/A	**NO**	introduce more writing in cpt content courses	AS
	g2. Procedural Reports										
	g3. Adaptive Communications	TCM 220	Oral Presentation	AY 2001-2002	70% > 3.5 on all items	2	13	N/A	**NO**	introduce more presentations in cpt content courses	AS
	g4. Presentation	TCM 220	Oral Presentation	AY 2001-2002	70% > 3.5 on all items	2	13	N/A	**NO**	introduce more presentations in cpt content courses	AS
	g5. Listening										
h. Lifelong Learning											
	h1. Tech Journals										
	h2. Emerging Technologies										
	h3. Advanced Degrees										
	h4. Continuing Education										
	h5. Certifications & Licensures										
i. Responsibilities											
	i1. Professional/Ethical Stds	CPT 410	Personal Code of Ethics	Spring 2001	80% = 4	47	48	98%	Yes	continuous improvement	BS
	i2. Community Involvement	IYI & Npower	22 projects & 30 volunteers						Yes	continuous improvement	
j. Be Cognizant											
	j1. Technology Impact										
	j2. Disability Awareness										
k. Quality & Improvement											
	k1. Systems Quality										
	k2. Leadership										
	k3. Goal Setting										

2001-2002 CNT DEPARTMENT ANNUAL ASSESSMENT – NARRATIVE SUMMARY

Historic Overview of Methodology and Process

The Dept. of Construction technology has taken a global methodology of assessment that will eventually involve all classes and all instructors in the assessment process. We strongly believe that all instructors will benefit from the process of assessment and thus student learning will improve thru out the curriculum. We are also striving for a diversified approach to collecting this data about student learning in our degree programs by collecting data for each a-k objective from several classes and from several types of student work items. We are also developing other data collection instruments such as surveys at the end of each class, and from an exit exam at the end of the degree. We also include data from school-wide alumni surveys and retention studies. For 2001 we began the use of the "Assessment Made Simple" guidebook developed by our department which included a standardized form for collection of data, as well as an explanation of assessment and the our process. See attached Assessment Checklist.

Process:

- Our Strategy is that every course and every instructor plays a part.
- We look at the information globally but we can track it back locally for improvements.
- We expect data collection from part time as well as full time instructors every semester
- Data is summarized per each ABET a-k towards a goal for each degree program
- Departmentally and programmatically we review the data and develop improvements to teaching and student learning and conformance to the Assessment Plan I (see attached)
- We repeat the process each semester and year to refine and make adjustments to address both the courses that aren't meeting the goals as well as the ones that do.
- We utilize the feedback and suggestions of our Industrial Advisory Board concerning relevance of our degree programs and the work force needs of Industry.
- We utilize Alumni data and University and School data to confirm and relate to assessment data concerning life long learning, and society, retention etc.

Improvements

- Faculty is participating in more CTL and OPD activities to enhance both their understanding of and application of best practices in student learning.
- Faculty meets regularly within the department to share experiences from these enrichment activities with those who did not attend.
- Collaboration of curriculum materials between different sections of the same course and with the predecessor and successor courses have successfully reinforced important concepts and allowed the learning from one course be integrated in others.
- Some faculty have developed and added surveys at the end of their course, asking students whether they feel they have learned the course objectives. We plan to expand this into more classes every year with Oncourse.
- Use of and development of sharable rubrics is an ongoing improvement to fairness and transferability of knowledge in grading
- Increased the training in and use of Oncourse for all instructors.
- By adding survey and course specific information to our required course CNT 390- Internship work Experience, we are getting useful "exit interview" type information on our courses as the student compares school to work experience for relevance.

F2001CNT BS w/cet DEGREE PROGRAMS

	1. What general outcomes are you seeking?	2. How would you know the general outcome if you saw it? (What will the student	3a. How will you help students learn it (in class or out of class)			3b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?				6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	TAC-ABET, see E&T matrix to cross match PUL's to ABET	measurable outcomes are course specific and listed on the sylabus for each course	FT=Full timer, PT=part-timer; Faculty Initials		the couse is taught using the following, LB=Lab; LX=Lecture; CO= coop; SL=Service Learning	course numbers; ART=Arch; CET=Civil; CNT=Constr	CA=Computer assmt;FX=Final Exam; GPJ=Group proj.; IPJ=Indiv Proj;IR=Internship Report;J=Journal;LG=Lab Group;LR=Lab Report;OP=Oral Pres.;P=Portfolio; PJB=Project Board;PSH=prob. Solv Homework;PSQ=PrSol. Quizz; PSX=Pr Solv Exam; RP=Research Paper; TH=Text Homework; TQ=Text.essay Quizz; TX=Text/essay Exam	no. of students to total number of students in the class		percentage of students from class that met the goal (of 60%)	did each course meet the goal	each faculty documents on the assessment data form improvements for next semester, and status of previous changes	Departmentally and as a School we review and discuss implications of our process and products on a continual basis
								>ave	total				
a)	Mastery of Discipline		**FT**	RB	LX	ART 165	FX,GPJ,TX	16	28	57%	no	see listings on form	
	Mastery of Discipline		**FT**	DC	LX	ART 284	FX	19	24	79%	YES	continual improvement	
	Mastery of Discipline		**pt**	cp		ART 285				na	na	continual improvement	
	Mastery of Discipline		**FT**	CK	LX,LB	CET 160	PSH	13	25	52%	no	see listings on form	
	Mastery of Discipline		**pt**	cp		CET 231				na	na	continual improvement	
	Mastery of Discipline		**FT**	ES	LX,LB	CET 452	TX,FX	8	14	57%	no	see listings on form	
	Mastery of Discipline		**FT**	RB		CNT 280	FX	9	17	53%	no	see listings on form	
	Mastery of Discipline		**FT**	ES	LX,CO	CNT 330	FX,GPJ,TX	9.5	14	68%	YES	continual improvement	
	Mastery of Discipline		na	na		CNT 447	not taught this semester			na	na	continual improvement	
	Mastery of Discipline		na	na		CNT 470	not taught this semester			na	na	continual improvement	
	Mastery of Discipline		na	na		CNT 494	not taught this semester			na	na	continual improvement	
								a)	ave	**61%**	**YES**	for this ABETobj.; by ave >60%	
b)	Apply knowledge		**FT**	DC		ART 284	FX,	19	24	79%	YES	continual improvement	
	Apply knowledge		**FT**	DC		CNT 105	CA,FX	16	24	67%	YES	continual improvement	
	Apply knowledge		pt	sb		CNT 342				na	na	continual improvement	
	Apply knowledge		**FT**	ES	LX,LB	CET 452	TX,FX	8	14	57%	no	see listings on form	
	Apply knowledge		na	na		CNT 494	not taught this semester			na	na	continual improvement	
								b)	ave	**68%**	**YES**	for this ABETobj.; by ave >60%	
c)	Improve Process		**FT**	BK	LB	CET 104	LG	15	24	63%	YES	continual improvement	
	Improve Process		**FT**	CK	LX,LB	CET 160	PSH	13	25	52%	no	see listings on form	
	Improve Process		pt	cp		CET 231				na	na	continual improvement	
	Improve Process		**FT**	BK		CET 267	course grade	5	10	50%	no	see listings on form	
	Improve Process		**FT**	BK		CET 312	course grade	26	30	87%	YES	continual improvement	
	Improve Process		**FT**	ES	LX,CO	CET 452	TX,FX	8	14	57%	no	see listings on form	
								c)	ave	**62%**	**YES**	for this ABETobj.; by ave >60%	
d)	Apply Creativity		**FT**	BK	LB	CET 267	LG	5	10	50%	no	see listings on form	
								d)	ave	**50%**	**NO**	for this ABETobj.; by ave >60%	
e)	Team member		**FT**	RB		ART 165	FX	16	28	57%	no	see listings on form	
	Team member		**FT**	ES	LB,CO	CNT 330	FX,GPJ,TX	9.5	14	68%	YES	continual improvement	
	Team member		na	na		CNT 447	not taught this semester			na	na	continual improvement	
	Team member		na	na		CNT 470	not taught this semester			na	na	continual improvement	
								e)	ave	**63%**	**YES**	for this ABETobj.; by ave >60%	
f)	solve tech problems		**FT**	RB	LB	ART 117	PSH	11	20	55%	no	see listings on form	
	solve tech problems		**FT**	RB		ART 284				na	na	continual improvement	
	solve tech problems		**FT**	BK	LB	CET 104	LG	15	24	63%	YES	continual improvement	
	solve tech problems		**FT**	CK	LX,LB	CET 160	PSH	13	25	52%	no	see listings on form	
	solve tech problems		**pt**	kj	LX	CET 260	PSQ,PSH			na	na	continual improvement	
	solve tech problems		**FT**	BK	LB	CET 267	LG	5	10	50%	no	see listings on form	
	solve tech problems		**FT**	BK	LB	CET 312	LG	26	30	87%	YES	continual improvement	
	solve tech problems		**FT**	SG		CET 350		17	24	71%	YES	continual improvement	
	solve tech problems		**FT**	ES	LX,LB	CET 452	TX,FX	8	14	57%	no	see listings on form	
	solve tech problems		pt	sb		CNT 280				na	na	continual improvement	
	solve tech problems		**FT**	ES	LB,CO	CNT 330	FX,GPJ,TX	9.5	14	68%	YES	continual improvement	
	solve tech problems		na	na		CNT 341	not taught this semester			na	na	continual improvement	
	solve tech problems		na	na		CNT 470	not taught this semester			na	na	continual improvement	
	solve tech problems		na	na		CNT 494	not taught this semester			na	na	continual improvement	
								g)	ave	**63%**	**YES**	by ave >60%	

F2001CNT BS w/cet DEGREE PROGRAMS

	1. What general outcomes are you seeking?	2. How would you know the general outcome if you saw it? (What will the student	3a. How will you help students learn it (in class or out of class)			3b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?				6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
	TAC-ABET, see E&T matrix to cross match PUL's to ABET	measurable outcomes are course specific and listed on the sylabus for each course	FT=Full timer, PT=part-timer; Faculty Initials		the couse is taught using the following, LB=Lab; LX=Lecture; CO= coop; SL=Service Learning	course numbers; ART=Arch; CET=Civil; CNT=Constr	CA=Computer assmt;FX=Final Exam; GPJ=Group proj.; IPJ=Indiv Proj;IR=Internship Report;J=Journal;LG=Lab Group;LR=Lab Report;OP=Oral Pres.;P=Portfolio; PJB=Project Board;PSH=prob. Solv Homework;PSQ=PrSol. Quizz; PSX=Pr Solv Exam; RP=Research Paper; TH=Text Homework; TQ=Text.essay Quizz; TX=Text/essay Exam	no. of students to total number of students in the class		percentage of students from class that met the goal (of 60%)	did each course meet the goal	each faculty documents on the assessment data form improvements for next semester, and status of previous changes	Departmentally and as a School we review and discuss implications of our process and products on a continual basis
								>ave	total				
g)	Communicate Effectivly		FT	RB	LB	ART 117	PSH	11	20	55%	no	see listings on form	
	Communicate Effectivly		FT	DC		ART 165	FX	15	29	52%	no	see listings on form	
	Communicate Effectivly		FT	BK	LB	CET 104	LG	15	24	63%	YES	continual improvement	
	Communicate Effectivly		pt	NA		CET 231				na	na	continual improvement	
	Communicate Effectivly		pt	KJ		CET 260				na	na	continual improvement	
	Communicate Effectivly		FT	BK	LB	CET 267	LG	5	10	50%	no	see listings on form	
	Communicate Effectivly		FT	BK	LB	CET 312	LG	26	30	87%	YES	continual improvement	
	Communicate Effectivly		FT	ES	LB,CO	CNT 330	FX,GPJ,TX	9.5	14	68%	YES	continual improvement	
	Communicate Effectivly		FT	CK	LX	CNT 342	PSH	12	19	63%	YES	continual improvement	
	Communicate Effectivly		FT	CK	LX	CNT 347	TH	11	23	48%	no	see listings on form	
	Communicate Effectivly		FT	ES		CNT 390	internship not graded			na	na	continual improvement	
	Communicate Effectivly		na	na		CNT 470	not taught this semester			na	na	continual improvement	
	Communicate Effectivly		na	na		CNT 494	not taught this semester			na	na	continual improvement	
								g)	ave	61%	YES	for this ABETobj.; by ave >60%	
h)	Pursue Lifelong Learning		FT	LL	LB,CO	CNT 105	TH	12	16	75%	YES	continual improvement	
	Pursue Lifelong Learning		na	na		CNT 447	not taught this semester			na	na	continual improvement	
									ave	75%	YES	for this ABETobj.; by ave >60%	
i)	Responsibilities		FT	LL	LB,CO	CNT 105	TH	12	16	75%	YES	continual improvement	
	Responsibilities		na	na		CNT 447	not taught this semester			na	na	continual improvement	
									ave	75%	YES	for this ABETobj.; by ave >60%	
j)	Be Cognizant												
									ave	na	NA	for this ABETobj.; by ave >60%	
k)	Qual, Timeliness, Imprmnt		FT	DC		ART 165	FX	15	29	52%	no	see listings on form	
	Qual, Timeliness, Imprmnt		FT	BK	LB	CET 104	LG	15	24	63%	YES	continual improvement	
	Qual, Timeliness, Imprmnt		FT	CK	LX,LB	CET 160	PSH	13	25	52%	no	see listings on form	
	Qual, Timeliness, Imprmnt		FT	BK		CET 260				na	na	continual improvement	
	Qual, Timeliness, Imprmnt		FT	BK	LB	CET 267	LG	5	10	50%	no	see listings on form	
	Qual, Timeliness, Imprmnt		pt	na		CET 350	not taught this semester			na	na	continual improvement	
	Qual, Timeliness, Imprmnt		FT	ES	Lx,CO	CNT 330	TX,GPJ,FX	9.5	14	68%	YES	continual improvement	
	Qual, Timeliness, Imprmnt		na	na		CNT 341	not taught this semester			na	na	continual improvement	
	Qual, Timeliness, Imprmnt		pt	sb		CNT 342				na	na	continual improvement	
									ave	57%	NO	for this ABETobj.; by ave >60%	
											YES	**CNTcet Bach. of Construction Technology program summary for all a-k**	

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING 2002 ANNUAL REPORT
Prepared by Charles Yokomoto, Brian King, and the Faculty of the ECE Department
May 20, 2002

1. What general outcomes are you seeking?	**2. What PULs are associated with the outcomes?**	**3. What will the student know or be able to do? (Measurable outcomes)**	**4. Where will your students learn it?**	**5. How will you help students learn it (in class or out of class)**	**6. How could (do) you measure each of the desired behaviors listed in column 2?**	**7. What are the assessment findings?**	**8. What improvements (and changes) have you made based on assessment findings?**	**9. What are the implications at the campus level?**
a1. The ability to use mathematics and engineering science (EC2000* Outcome a) This part of ABET Criterion 3, Outcome a, is interpreted to mean the application of mathematics and engineering science. The applied aspects of engineering are assessed in outcomes b, c, and k. *EC2000 refers to the current Accreditation Board for Engineering and Technology (ABET) accreditation criteria for engineering programs.	1d, 2a, b, d, e 3a, b, c 4a, b	a1(1) The ability to solve engineering science problems that require depth on knowledge in the major. a1(2) The ability to solve engineering science problems that require knowledge of mathematics.	EE201, 202, 255, 264, 266, 301, 302, 311, 362, 382, 365, 369, 444. In addition to the mathematics that they use in their engineering courses, EE majors are required to take MATH 163, 164, 261, and 262.	The EE classes generally use Lectures, problem solving homework, and problem solving discussion. EE 255 uses small group experiences. The MATH courses are traditional large lecture classes.	EE students' ability to use mathematics and engineering science is assessed in EE305, 382, and 444. In the future, EE 305 will be replace by EE 311, and EE 444 will be upgraded with a laboratory to become EE 440.	From EE492: 78% of the class scored 3.0 or better out of 4.0 (goal: 70%) From EE301: From EE444: Solving problems that require mathematics and engineering science--students averaged 46% (desired average = 58%) – (goal not met) Ability to solve problems that require depth of knowledge—1 of three problems solved successfully (goal not met) Problems that require comprehension of text—1 of three problems solved successfully (goal not met.	EE 444 is one of the most difficult of our senior courses. Thus it is not surprising that our goals were not met on all three measures. The Curriculum Committee will be asked to discuss this and related problems.	The campus must consider the question of shared responsibility in difficult courses such as EE 444. The instructor and the student should both work toward raising the level of performance. Instructors must be able to receive help in interventions, and students must become better learners.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
a2. The ability to use science in engineering (EC2000 Outcome a). This part of ABET Criterion 3, Outcome a, is interpreted to mean the application of science principles taught in our engineering courses. The two most likely candidates are EE 305 (elective) and EE 311 (required).	1d, 2a, b, d, e 3a, b, c 4a, b	Level 1: The ability to recall memorized information at a basic level. Level 2: The ability to recall routine knowledge of definitions, principles, or laws, possibly without true understanding Level 3: The ability to use basic definitions, principles, or laws, requiring an understanding rather than rote recall Level 4: The ability to apply reasoning that integrates knowledge of different kinds to come up with the correct response	Through 2001-02, EE 305 will be used to assess the ability to use science in engineering. Until the current academic year, EE 305 was required. Now, EE 305 is an elective, and EE 311 is required. In addition, EE majors are required to take Phys 152 and Phys 251.	Both courses are taught in a conventional lecture format where the instructor gives lectures on the topics. Students solve homework problems and take written tests which contain content knowledge questions and problem solving.	Student final exams in EE 305 were assessed. Two types were written. One type assessed students' general knowledge of the science principles through multiple-choice questions. The other type assessed problem solving.	From EE305: The final exam contained 12 multiple choice and short answer questions that tested student ability to apply knowledge of science (physics of semiconductor materials) to the design and analysis of semiconductor devices. The class average bettered the instructors target on eight of the 12 questions.	No improvements are necessary.	None

1. What general outcomes are you seeking?	**2. What PULs are associated with the outcomes?**	**3. What will the student know or be able to do? (Measurable outcomes)**	**4. Where will your students learn it?**	**5. How will you help students learn it (in class or out of class)**	**6. How could (do) you measure each of the desired behaviors listed in column 2?**	**7. What are the assessment findings?**	**8. What improvements (and changes) have you made based on assessment findings?**	**9. What are the implications at the campus level?**
b1. The ability to design and conduct experiments (EC2000 Outcome b)	2a, b, c, d 3b 4a, b, c	EE students are required to take EE207, 208, 267, 301, 362, 492	EE207, 208, and 267 provide laboratory experiments for lecture classes EE201, 255, and 266, respectively. EE362 is a lecture/laboratory course, EE492 is a capstone design course, and EE301 is an engineering science course where students cover material on designing and conducting experiments.	This general outcome is assessed in EE492, the senior capstone design course. This is assessed as part of the grading of the project through an evaluation of the final report and the oral presentation. This outcome is assessed in EE492, the capstone design course.	Lab reports in EE 207, 208, 267, and 362. Problem solving in EE 301, 362. Capstone design project in EE 492.	From EE 492: Students were assessed on their ability to test a design to determine its functionality. The class average was 3.2 out of 4.0 (goal = 3.0), and 89% of the class scored at least 3.0 (goal = 70%)	None needed	None

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
b2. The ability to analyze and interpret data (EC2000 Outcome b)	2a, b, c, d 3b 4a, b, c	Students will be able to interpret output waveforms, output data tables from computer programs and simulators, and input-output data from systems.	EE students are required to take EE 207, 208, 266, 267, 301, 302, 311, 440, and 492.	EE207, 208, and 267 provide laboratory experiences that are linked to lecture courses EE201, 255, and 266, respectively. EE266 is an engineering design course, and EE301, 302, 311, and 440 are engineering science courses.	This general outcome is assessed in EE492, the senior capstone design course. This is assessed as part of the grading of the project through an evaluation of the final report and the oral presentation. This outcome is assessed in EE492, the capstone design course.	This outcome was not satisfied. The average score (Fall 2000) was 2.2 out of 4.0 (goal 3.0) and only 30% of the class scored better than 3.0 (goal 60%).	The ECE Curriculum Committee has selected required, prerequisite courses where the analysis and interpretation of data can be emphasized. This includes EE207, 208, and 267, which are laboratory courses where students make measurements that result in data that can be analyzed and interpreted.	

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
c. The ability to design a system, component, or process to meet desired needs (EC2000 Outcome c)	2a, b, c, d, e 3a, b, c 4a, c	Students will be able to c(1) Conduct library and Internet research to initiate the design process. c(2) Prepare a list of alternative approaches to accomplish the design. c(3) Execute the design according to the formal design process taught in the course. c(4) Complete the design project successfully.	EE students are required to take EE208, 255, 266, 267, 301, 302, 311, 362, 382, 444, 492.	EE208 and 267 provide laboratory experiences that are linked to lecture courses EE255 and 266, respectively. EE266 is an engineering design course, and EE301, 302, 311, and 440 are engineering science courses. EE266 and 382 are engineering design courses. EE362 is a lecture/laboratory course.	This general outcome is assessed in EE492, the senior capstone design course. This is assessed as part of the grading of the project through an evaluation of the final report and the oral presentation.	From data from the Fall 2000 EE492 class, c(1) was clearly met (average score = 3.2, goal = 3.0; 67% of the class > 3.0, goal = 60%) c(2) was met (75% of the class > 3.0, goal = 60%). c(3) was clearly met (average score = 3.0, goal = 3.0; 75% of the class > 3.0, goal = 60%) c(4) was clear y met (average score = 3.0, goal = 3.0; 75% of the class > 3.0, goal = 60%)	Although all four outcomes were met, outcome c(2) on the consideration of alternatives exhibited the weakest score. Brainstorming exercises will be added to EE492 and other courses to help students engage in the process of brainstorming for the purpose of considering alternative designs.	

1. What general outcomes are you seeking?	**2. What PULs are associated with the outcomes?**	**3. What will the student know or be able to do? (Measurable outcomes)**	**4. Where will your students learn it?**	**5. How will you help students learn it (in class or out of class)**	**6. How could (do) you measure each of the desired behaviors listed in column 2?**	**7. What are the assessment findings?**	**8. What improvements (and changes) have you made based on assessment findings?**	**9. What are the implications at the campus level?**
d. The ability to work on interdisciplinary teams	2c 4b, c 5c	Students will demonstrate: d(1) Attendance at group meetings d(2) Contributions to group discussions d(3) Carrying out assignments d(4) Spirit of teamwork d(5) was assessed holistically from instructor and advisor observations of teams in the laboratory and in team meetings with the instructor or advisor.	EE students are required to take ENGR195, and EE 401, and 492, all of which use interdisciplinary teams to some degree.	Almost all of the work done in the three courses listed in the previous column require students to work in groups. In EE492, students receive formal instruction in leadership and teamwork (***is this right, Keith?)***	Outcome d1 was assessed in EE401 using a fairly detailed rubric is used. Outcome d2 was assessed holistically through instructor and advisor observations. Outcome d3 was assessed through an essay written on an exam.	Outcomes d(1) through d(4) were assessed in EE/ME401, where EE and ME students worked in mixed teams. Using a holistic measure of teamwork that was based on the difference of the highest and lowest scores of self-rating, students were successful on this teamwork assessment. d(5): Instructor's evaluation of teamwork through holistic observations shows that t his outcome was clearly met (average score over all teams > 3.0 out of 4.0 and more than 80% of the teams scored 3.0 or better.)	No improvements needed at this time.	The ability to work in teams is not explicitly stated in the PULs but is in directly included in PUL 5c: Operate with civility in a complex social world. Perhaps the ability to work in teams should be given more visibility.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
e. The ability to identify, formulate, and solve engineering problems (EC2000 Outcome e)	1b, d 2a, b, c, d, e 3a, b, c 4a, b, c	e(1) Students will be able to translate a need into a design task identifying the need and formulating it as a design task.	EE students are required to take ENGR197, and EE201, 202, 207, 208, 255, 264, 266, 267, 302, 311, 382, 440, and 492.	ENGR197, and EE201, 202, 255, 264, 266, 302, 211, 382, and 440 are traditional lecture type classes where instructors lecture on the subject, students solve homework problems. EE 207, 208, and 267 are laboratory courses where students are given a goal and must determine the task to be accomplished.	This outcome is assessed in EE 492 holistically in an assessment of the students' ability to identify and formulate the design task that is assigned to them. Although the assessment is holistic, it is based on the instructor's interaction with the design team throughout the semester-long project.	e(1): scores on the students' ability to identify and formulate the design problem for their capstone design problem was met, but not clearly met (60% of the class $\geq$ 3.0 out of 4.0, goal = 60%)	No changes are necessary.	Since this ABET outcome is related to PUL 2 (Critical Thinking), instructors should place more emphasis on critical thinking and problem solving processes.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
f. An understanding of professional and ethical responsibilities (EC2000 Outcome f)	2a, b 3b, c 4b, c 5a, b, c 6a, b	Ability to: f(1) Describe how an ethics course can help a practicing engineer. f(2) Describe how codes of ethics help an engineer work ethically. f(3) Analyze a behavior using models of right and wrong (ethical bases) f(4) Analyze ethics codes using models of right and wrong (ethical bases) f(5) Describe how group discussions can help with critical thinking. f(6) Discuss ethical issues in the workplace. f(7) Described how knowledge of cultures is needed for ethical behavior	EE students are required to take EE 400 and 401.	EE400 is a seminar course were representatives of local industry are brought in as guest lecturers, describing what engineers do on the job. EE 401 is a course in professionalism and ethics. The course contents include principles of ethics and applied ethics, workplace ethics, and ethics as a process for resolving dilemmas and deciding right from wrong.	The outcomes were assessed in EE401 using a variety of rubrics to score assignments and by using an essay final exam.	The scores on the final exam in EE401 on all outcomes were satisfactory except for f(5), critical thinking in ethical situations, and f(7), the understanding of different cultures.	More time, emphasis, and/or assignments that require critical thinking and understanding of cultures has been programmed into the course. Students will be given additional exercises in applying critical thinking to an ethical situation and on the effect of different cultures on engineering decision making.	A focus on ethics and professionalism on campus, focusing on awareness of the importance of ethical behavior may be needed.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
g1. The ability to communicate effectively orally (EC2000 Outcome g)	1c	We have defined oral presentations as taking place in the workplace. Students are assessed in TCM 360 on the following competencies: g1(1) Introduction g1(2) Content g1(3) Assumptions g1(4) Conclusions g1(5) Organization g1(6) Visuals g1(7) Style/Wording g1(8) Length g1(9) Grammar g1(10) Delivery g1(11) Pace/Volume g1(12) Body Lang. g1(13) Visual Equip g1(14) Q&A time g1(15) Appropriateness g1(16) Overall rating	ENGR 195 EE401, 492 TCM360	In ENGR195, students receive instructions in the use of Power Point for their team presentations and receive guidelines on what makes a good presentation. In EE401 and 492, students are given instructions on how to put together a high quality team presentation In TCM 360 students receive two credits of instructions in writing and making oral presentations	In TCM 360, oral presentations were assessed by a team of faculty members who were trained by Dr. Marjoire Hovde. They use a scoring rubric that was developed by Dr. Hovde.	Student performance was satisfactory on all outcomes in the TCM 360 assessment except for Introduction and Conclusions. In EE 401, students made a major group presentation on an ethical issue. The team grades for the seven groups were 1 A, 5 A-, and 1 B+. We consider this to be successful. In EE 401, in their individual presentations in the above group presentation, the grades were 9 A, 13 A-, 5 B+, 1 C+, which we consider to be successful.	In TCM 360, more emphasis is being placed on the Introduction and Conclusions sections, including examples of best practices and peer tutoring. Students must be made to realize that these two sections are as important as the main body of the presentation.	More emphasis may need to be placed on these two parts of a presentation in COMM R110. Oral presentations may need to be considered for other course, both in the EE curriculum and the School of Engineering and Technology and in other departments and schools.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
g2. The ability to communicate effective in writing (EC2000 Outcome g)	1a	We have defined writing as workplace writing. Students are assessed on the following competencies: g2(1) Introduction g2(2) Content g2(3) Assumptions g2(4) Conclusions g2(5) Organization g2(6) Visuals g2(7) Style/Wording g2(8) Page Layout g2(9) Length g2(10) Grammar g2(11) Sources g2(12) Appropriateness g2(16) Overall rating	ENGR 195 EE401, 492 TCM360	In ENGR195, and EE 401 and 492, students receive instructions in the qualities of good written paper In TCM 360 students receive two credits of instructions in writing and making oral presentations	Assessment of students' written papers was assessed in TCM 360 using a scoring rubric developed by Dr. Marjorie Hovde of the TCM program.	Performance on all outcomes was satisfactory except for g2(2) Content, g2(4) Conclusions. g2(6) Visuals, and g2(11) Sources	Improvements put in place include more emphasis on the four areas of weakness.	More emphasis may need to be placed on these four parts of a presentation in writing courses. Written papers may need to be considered for other course, both in the EE curriculum and the School of Engineering and Technology and in other departments and schools

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
h. A broad education necessary to understand the impact of engineering solutions in a global and societal context (EC2000 Outcome h)	3a, b, c 4c 5a, b 6a	Ability to discuss how U.S. technological developments can have an impact on society locally and globally, the latter requiring an understanding of different cultures	EE 401	There are 2.5 hours in EE401 on global implications of engineering decisions. Also, throughout the course, reference is constantly made to different cultures and to the responsibility of engineers to society.	h(1). A question on this outcome was written for the EE 401 final exam. h(2). Students were asked to write a paper that described how two of their general education electives helped them understand the global nature of engineering in particular and business in general.	h(1): This outcome was met successfully on the Fall 2000 essay exam question, with 70% of the class scored 8.0 out of 10.0 or better (goal 70%). On the Spring 2002 exam, performance was better, with a class average of 9.1 out of 10 (goal = 8.0) and 94% of the class scored 8.0 or better (goal = 70%). h(2): 11 A, 10 B, 4 C, 1 D, 1F for an overall average of B+, which we consider to be successful.	None needed at this time.	None, since global context is one of the campus Principles of Undergraduate Learning.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
i. A recognition of the need for and the ability to engage in lifelong learning. (EC2000 Outcome i)	1b, e 2b	i(1): Graduates of the program will report continued education by reporting that they have attained advanced degrees and certificates, have attended workshops. i(2): Students will demonstrate the ability to use the library and the Internet to search for information for their projects.	EE 362, 401, 492	EE 401 students are given assignments that require them to collect ethics articles from the print media and Internet articles and write an analysis of them. EE492 students are required to do library and Internet research to find resource materials for their capstone design project.	EE 401: Students are assessed on a group homework project that requires them to find print and Internet articles that demonstrate an ethical issue. Also, the groups may use library and Internet searches to find articles that will improve their group presentation (term project.) EE 492: Students are assessed on their use of the library and Internet to search for background information for their design projects.	EE401--Collecting news articles and interpreting them: 5 groups A, one group C, one group B, which we consider successful demonstration of this aspect of lifelong learning. EE492: Students in this course (Fall 2000) clearly met the outcome (average score = 3.2, > the desired 3.0; 67% of the class above 3.0, > the desired 60%) An alumni survey was conducted by IMIR with the following findings, which we consider successful indications of lifelong learning: Advanced degrees: 8 of 30 (27%) received advanced degrees in business, law, engineering, dentistry, or medicine. Certificates rcvd: 9 Workshops and short courses: 17	No improvements are needed at this time.	No implications at this time.

						Journals subscribed: 11		

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
j. A knowledge of contemporary issues (EC2000 Outcome j)	1b 2e 4b 5 b 6b	j(1); Students are able to describe current issues in the public forum. j(2) Students are able to identify and interpret current ethical issues in the print and Internet media. j(3) Students will be able to write an essay on the final exam on the importance of knowledge of current events to a professional engineer.	EE 401	Students are given an assignment in EE (five weeks) where they must find news articles and magazine articles in the print media and on the Internet that describe current ethical issues	j(1) is assessed through a brainstorming group quiz where groups must write down as many current issues as they can. Issues do not have to be related to ethics. j(2) is assessed by grading the quality of the ethical issues submitted by students on the assignment that requires them to find articles that describe ethical issues. j(3) is assessed on the final essay exam.	j(1): The groups averaged 8.7 current event items, from a low of 5 to a high of 14, on this 10 minute exercise, which we consider successful. j(2): Six groups recorded the following group grades—A+, A+, A+. A-, A-, B+, C, which we consider successful. j(3): From the Fall 2000 semester, the class average was 8.5 out of 10 (goal 8.0) and 80% of the class scored 8.0 or better (goal 70%). In the Spring 2002 semester, the class averaged 9.2 out of 10 (goal = 8.0) and 100% scored 8.0 or better (goal = 70%) Both performances are considered to be successful	None needed at this time.	We recommend that this become part of the Principles of Undergraduate Learning because of its importance for good citizenship.

1. What general outcomes are you seeking?	2. What PULs are associated with the outcomes?	3. What will the student know or be able to do? (Measurable outcomes)	4. Where will your students learn it?	5. How will you help students learn it (in class or out of class)	6. How could (do) you measure each of the desired behaviors listed in column 2?	7. What are the assessment findings?	8. What improvements (and changes) have you made based on assessment findings?	9. What are the implications at the campus level?
k. The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (EC2000 Outcome k)	1e 3b, c 4a	k(1) Students will be able to use engineering tools successfully in the completion of their senior design project.	ENGR 195, 196, 197 EE 202, 207, 264, 266, 267, 311, 321, 382	Homework problems in lecture type classes require students to use mathematical tools and software tools. Laboratories require students to use laboratory equipment, mathematical tools, design tools and computer tools. Project courses require students to use mathematical tools, software tools, research tools, and/or design tools.	k(1) is assessed by the instructional team or the course supervisor that grades the senior design project reports. This ability is graded on a scale of 4: excellent 3.: competent 2: satisfactory 1: marginal 0: poor	k(1) On the senior design project, 78% of the student teams demonstrated that they were competent of better (> 3.0 on a scale from 0 to 4.0)	No improvements needed at this time.	None

OUTCOMES ASSESSMENT PLAN

Department of Electrical and Computer Engineering Technology

Prepared by Richard Pfile and the Faculty of the Department

May 17, 2002

The department used multiple techniques to get assessment data. Students were surveyed to determine their satisfaction with the department and to determine if course objectives had been met. Recent graduates were surveyed to determine how well the department prepared them for their jobs. Many data points were also collected from specific class assignments to evaluate specific areas such as communications skills, ability to function effectively on teams, and applying creativity in the design of systems. Only one unique course in the new CpET has been taught so far, so a separate summary was not made for the CpET program. A summary report for the BMET program is also included. Some highlights of the assessment effort are listed.

Departmental survey of continuing students. This survey was given to 53 ECET A.S. students and 54 ECET B.S. students. The survey was given to students in classes that included a very limited number of majors outside the department. The survey addressed students' satisfaction with advising, faculty office hours, computer equipment, laboratory accessibility, course materials used, opportunities to get to know other ECET students and the faculty and overall satisfaction with the department. The results were quite good. For the overall survey 78.7 percent of respondents strongly agreed or agreed that the ECET department was doing a good job in the areas covered by the survey. 85.8% percent of students surveyed strongly agreed or agreed that overall they were satisfied with the department. 92.6% of B.S. students indicated they were satisfied and 78.8 of A.S. students indicated they were satisfied with the department. At the low end of the scale, satisfaction with computer equipment was only 57.9%. This number was 40.7% for B.S. students and 75.5% for A.S. students, indicating that there has been some recent improvement. The department survey form and the spreadsheet with the results are attached.

Course Objectives. Course objectives were required for all courses taught in the spring 2002 semester and student surveys were administered to determine if the objectives were met. These objectives were then classified into ABET a-k criteria to see where and how well the department was meeting the a-k criteria. Course objective are action oriented and students were asked if they could perform the task covered by the objective. Results in the A.S. and B.S. degree programs indicate the percentage of students who strongly agree or agree they can perform the function indicated by the course objective. This exercise very clearly brings out areas where a department may be weak in the sense that very few course objective address the ABET criterion. Very few course objectives related to ABET items i, j, and k. An overwhelming number of course objectives related to criteria a (mastery). This was somewhat expected since the primary goal of a technological department such as the ECET department is mastery of the skill set, but the department needs to make sure that it is graduating well-rounded students by intentionally addressing some of the softer ABET objectives. Course content in these areas needs to be beefed up.

The results from the student surveys are good. In most of the ABET criterion areas, approximately 80% of students strongly agreed or agreed they could perform course objectives. Specific results for ABET a-k are included in the A.S. and B.S. program summaries. The spreadsheet results are also attached. In the future we will have faculty evaluate how well they believe students can perform the various course objectives.

Other Assessment Techniques. In addition to evaluating course objectives, the department used specified course assignments, laboratory assignments, class projects, course papers, student presentations in courses, and selected examination questions to assess the various ABET a-k criteria. We focused on courses that were terminal courses in analog and digital sequences in both the A.S. and B.S. programs. The department's capstone senior design courses were heavily assessed for both technical and communications skills. The results from these other assessment techniques are included in the A.S. and B.S. summary reports.

Departmental survey of recent graduates. Eighty-six percent of graduates surveyed approximately 6 months after graduation indicated that the ECET department has done a good or excellent job of preparing them for their current assignment.

Biomedical Electronics Technology Associate Degree Program. The blend of medicine and electronics results in a varied curriculum encompassing a wide range of materials. Surveys of students have indicated strengths and weaknesses in the curriculum. It appears that students indicate that they are able to solve technical problems and are proficient with the medical knowledge necessary to function in the health care environment. Some areas of weakness may include are exploration of medical ethics and the need for respect for various cultures within the hospital environment. The unique and stressful pace of health care requires a particular decorum and accountability. More attention will be placed on some of these skills in the future.

It should be noted that the BMET A.S. degree is not ABET accredited and will not be in the future. Employers see no benefit to this distinction as well as virtually all BMET programs nationally have not pursued this accreditation level.

Students are encouraged to participate in the national certification exam provided by Association for the Advancement of Medical Instrumentation. Certified BMETs are highly sought after and it is this ultimate assessment tool which is useful to this program.

Summary

The ECET Assessment Summary of the A.S. Degree Program – Spring 2002, the ECET Assessment Summary of the B.S. Degree Program – Spring 2002, the Department Objectives Survey, and the A.S. and B.S. Objectives Survey portray the status of the ECET degree programs. The status of the programs is strong and viable. Weaknesses that were recognized a few years earlier, such as computer support, have been addressed and greatly improved. Further assessment may be conducted from the employers' and

graduates' viewpoints by continuing the survey work that was conducted in the 2000 year. These and other inputs are continually being used as part of the department's Continuous Improvement Program.

ECET ASSESSMENT SUMMARY OF THE EET A.S. DEGREE PROGRAM
Department of Electrical and Computer Engineering Technology
Spring 2002

1. What general outcomes are you seeking?	**2. What will the student know or be able to do (measurable outcomes)?**	**3a. How will you help students learn it?**	**3 b. Where will your students learn it?**	**4. How could (do) you measure each of the desired behaviors listed in column 2?**	**5. What are the assessment findings?**	**6. What improvements (and changes) have you made based on assessment findings?**	**7. What are the implications at the campus level?**
Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline (ABET Criterion 1, item a)	There are sets of generally accepted skills that are used in the discipline such as circuit analysis and design, analog and digital design, and programming.	Laboratories are a strong component of this learning objective. In addition normal classroom activities such as lectures, homework, and group learning activities.	Mastery of a skill set is a primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 203 course objectives identified with this criterion. Answers to selected exam questions from a terminal analog course, EET204 and the third exam in EET205 the terminal course in the digital sequence, were analyzed to determine mastery.	The department is strong is this outcome with many relevant course objectives and 86.8 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from selected EET 204 questions indicate a 3 out of a possible 5 for mastery. In EET205 61% of the students made a 70% or higher on the third exam.	Courses are assessed at the end of each semester for continuous improvement. In the future the student self-assessment will be augmented with an instructor assessment of students' ability to comprehend the course objectives.	The department is placing a heavy reliance on evaluation of course objectives for assessment. It is important that the course objectives be relevant. The university has funded a PRAC grant to reduce material from professional and certification exams into relevant course objectives that are needed for the Computer Engineering Technology program.

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Apply current knowledge and adapt to emerging applications in mathematics, science, engineering and technology (ABET Criterion 1, item b)	This is determined by a student's ability to synthesize information and arrive at reasoned conclusions.	Laboratories are a strong component of the learning. In addition normal classroom activities such as lectures, homework, and group learning activities.	EET105, EET155, EET234, and EET302 have course objectives relevant to this criterion.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. Altogether thirteen course objectives from courses taught in the spring 2002 semester related to this course objective.	88.5 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives.	Courses are assessed at the end of each semester for continuous improvement.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Conduct, analyze and interpret experiments and apply experimental results to improve processes (ABET Criterion 1, item c)	Students ability to conduct experiments and properly measure outputs and form proper conclusions based on the outputs.	Laboratories are a strong component of this learning objective. All EET courses include a laboratory component.	Students will learn this objective in all AS courses, since they are all include a laboratory component.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 33 course objectives identified with this criterion. Laboratory practicals are given in many courses that require a student to design a circuit or system, construct it, and analyze the results to determine if improvements are needed.	The department is strong in this outcome with many relevant course objectives and 88.0 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. 85 percent of students scored 70% or higher on the EET205 laboratory practical. This class is the terminal digital course in the A.S. program.	Courses are assessed at the end of each semester for continuous improvement.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Apply creativity in the design of systems, components or processes appropriate to program objectives (ABET Criterion 1, item d)	Students should be able to design a system by creatively applying fundamental skills learned in the curriculum.	Some laboratory assignments and projects require a creative approach such as the course projects in EET114 EET155, EET154, EET204 and EET205 as well as 80% of the laboratories in EET302.	EET105, EET114, EET155, EET204, EET205, EET234, and EET302 have course objectives that have a creative component.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 39 course objectives identified with this criterion. We also assigned a special problem in EET205 and EET204 that required a creative solution. Answers to a design question from a terminal analog course, EET204, were analyzed to determine creativity.	The department is strong is this outcome with many relevant course objectives and 93.9 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from EET204 and EET205 indicate that students struggle with creative solutions with only 27 percent of students meeting most of the problem objectives and 23 percent of the students meeting no problem objectives in EET205. In EET204 applying creativity was ranked a 2 on a scale of 5.	Courses are assessed at the end of each semester for continuous improvement. We will investigate ways to teach the engineering design process earlier in the curriculum.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Function effectively on teams (ABET Criterion 1, item e)	Team performance was evaluated in EET 205.	Laboratories are a strong component of this learning objective. In addition normal classroom activities such as lectures, homework, and group learning activities.	Students work in small groups in most of our laboratories and learn practical group skills. In addition, courses taught in spring 2002 have 9 course objectives related to group activities. Courses EET155, EET234 and EET205 have group projects.	A self-assessment was completed by students and the instructor teaching EET 205. This course was used to evaluate group activity since it is one of the last courses taken for the A.S. degree. Course objectives were evaluated by students.	The finding from EET 205 indicate that group scores were acceptable. 75 percent of the group members thought there group was effective and 82 percent felt the group communicated well. One problem area was participation in that only 68 percent of group members felt all members contributed to the project. 93.0 percent of the students strongly agree or agree that they can perform tasks indicated by the course objectives.	Courses are assessed at the end of each semester for continuous improvement. We plan to have students write down the qualifications for a good lab partner in EET102 and EET154 and then use this data as a teaching tool. Lab partners will be evaluated based on this criteria.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Identify, analyze and solve technical problems (ABET Criterion 1, item f)	There are sets of generally accepted problem types used in the discipline.	A large portion of normal classroom activities such as lecture and homework are devoted to teaching this objective. Laboratories also play a strong role in teaching related to this learning objective.	Mastery of discipline related problem solving is primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 75 course objectives identified with this criterion. Answers to a selected problem from a terminal analog course, EET204, were analyzed to determine problem solving skills. The power supply project in EET 154 was evaluated by the instructor: 23 of 26 students were successful, an 88 % success rate.	The department is strong is this outcome with many relevant course objectives and 86.3 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from the selected EET 204 problem indicate a 4 out of a possible 5 for problem solving. Results from EET154 indicate that ….. percent of the students' power supplies were operational.	Courses are assessed at the end of each semester for continuous improvement. We will investigate ways to teach the engineering design process earlier in the curriculum.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Communicate effectively (ABET Criterion 1, item g)	We evaluated based on communications skills that are expected by industry of recent AS graduates.	Students are required to write papers that are returned for corrections. Oral presentations are critiqued. ENGW131 and COMM R110 are required courses in the curriculum.	Students take the required English composition and speech courses. In addition, papers are required in EET154 and EET204. Six course objectives from courses taught in spring were related to communications. Nearly all laboratories require written reports.	Oral presentations were evaluated in EET302 and writing skills were evaluated in EET204.	Written communications specifically evaluated in EET204 were ranked at a 4 on a scale of 5 (best). Oral presentations evaluated in EET302 indicate that 90% of students made presentations that the instructor felt would be acceptable for a recent A.S. graduate.	Courses are assessed at the end of each semester for continuous improvement.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Recognize the need for and possess the ability to pursue lifelong learning (ABET Criterion 1, item h)	Evaluate student's ability to investigate an unfamiliar topic outside of class using global research tools.	Provide guidance to direct students to appropriate research tools.	EET103 and EET234.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There one course objective identified with this criterion.	The department is strong is this outcome with many relevant course objectives and 86.8 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives.	The department will evaluate how to more fully cover this criterion in the A.S. program. The completeness of the research and dependability of the sources will be assessed.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Understand professional, ethical and societal responsibilities (ABET Criterion 1, item i.)	Evaluation of course objectives and review prive/ Performance ratios from student designs.	Ethical case studies related to safety are presented in the classroom. Teach design tradeoffs based on costs.	EET 154 and EET212.	Student self-assessment of their comprehension of this course objective was measured for EET212 during the spring semester.	71.4 percent of students indicating they strongly agree or agree that they understand ethical issues related to safety.	This area needs to be broadened and strengthened in the curriculum. Ethics related case studies will be inserted.in EET 212.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Recognize contemporary professional, societal and global issues and be aware of and respect diversity (ABET Criterion 1, item j)	Respect diversity: Increased awareness of personality types and individual differences.	Students are taught to identify their own personality types based on standard scales such as Meyers-Briggs.	EET103	Classroom lecture accompanied by on-line assessments.	Evaluating classroom discussion regarding identified types and ramifications of that type. 95.7 percent of class strongly agreed or agreed that they could identify and define fundamental personality types.	Diversity related case study will be inserted.in EET 212.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it?	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Have a commitment to quality, timeliness and continuous improvement (ABET Criterion 1, item k)	Timeliness outcomes measured and a rubric for quality will be generated.	Enforcing strict project deadlines and explain the quality rubric.	EET154 and EET155	Fill in rubric.	Not measured for Spring 2002. This will be measured in the future.	In the future the EET154 and EET155 projects will be evaluated for timeliness and quality.	

ASSESSMENT SUMMARY OF THE B.S. DEGREE IN ELECTRICAL ENGINEERING TECHNOLOGY
Department Of Electrical And Computer Engineering Technology
Spring 2002

1. What general outcomes are you seeking?	**2. What will the student know or be able to do (measurable outcomes)?**	**3a. How will you help students learn it (in class or out of class)**	**3 b. Where will your students learn it?**	**4. How could (do) you measure each of the desired behaviors listed in column 2?**	**5. What are the assessment findings?**	**6. What improvements (and changes) have you made based on assessment findings?**	**7. What are the implications at the campus level?**
Demonstrate an appropriate mastery of the knowledge, techniques, skills and modern tools of their discipline (ABET Criterion 1, item a).	There are sets of generally accepted skills that are used in the discipline such as circuit analysis and design, analog and digital design, and programming.	Laboratories are a strong component of this learning objective. In addition normal classroom activities such as lectures, homework, and group learning activities.	Mastery of a skill set is a primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 34 course objectives from courses taught in spring 2002 identified with this criterion. This outcome was also evaluated in EET491 senior design, the department's terminal course and in EET303 a communications course that encompasses knowledge from several analog courses. The design itself and the design process were evaluated in EET 491. Selected exam questions were used in EET303.	The department is strong is this outcome with many relevant course objectives and 77.5 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from EET491 evaluations are a 4.2 out of a possible 5 for mastery. The results from EET 303 were 3.2 out of a possible 4. The results from EET491 were a 4.2 out of a possible 5.	Courses are assessed at the end of each semester for continuous improvement. In the future the student self-assessment will be augmented with an instructor assessment of students' ability to comprehend the course objectives.	The department is placing a heavy reliance on evaluation of course objectives for assessment. It is important that the course objectives be relevant. The university has funded a PRAC grant to reduce material from professional and certification exams into relevant course objectives that are needed for the Computer Engineering Technology program.

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Apply current knowledge and adapt to emerging applications in mathematics, science, engineering and technology (ABET Criterion 1, item b).	This is determined by a student's ability to synthesize information and arrive at reasoned conclusions.	Laboratories are a strong component of the learning. In addition normal classroom activities such as lectures, homework, and group learning activities.	EET303, EET357, EET490, and EET491 have course objectives relevant to this criterion.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. Altogether thirteen course objectives from courses taught in the spring 2002 semester related to this course objective. This outcome was also evaluated in EET303 a communications course that encompasses knowledge from several analog courses. Selected exam questions were used in EET303.	80.6 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from EET303 were a 2.9 out of a possible 5.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Conduct, analyze and interpret experiments and apply experimental results to improve processes (ABET Criterion 1, item c).	Students ability to conduct experiments and properly measure outputs and form proper conclusions based on the outputs.	Laboratories are a strong component of this learning objective. All EET courses include a laboratory component.	Students will learn this objective in all AS courses, since they are all include a laboratory component.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 13 course objectives identified with this criterion. Laboratory practicals are given in many courses that require a student to design a circuit or system, construct it, and analyze the results to determine if improvements are needed. Laboratory practical data from EET305 the terminal microprocessor course was also evaluated.	The department is strong in this outcome with many relevant course objectives and 71.4 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. 63% of students in EET305 scored 70% or higher on the laboratory practicals.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Apply creativity in the design of systems, components or processes appropriate to program objectives (ABET Criterion 1, item d).	Students should be able to design a system by creatively applying fundamental skills learned in the curriculum.	Some laboratory assignments require a creative approach such as a lab project in EET307 where students perform two designs and compare and contrast them. Results are presented in persuade investors to invest in the project. In EET360 students design a production line and make the case for it to potential investors.	EET305, EET303, EET307, EET360, EET490, and EET491 have course objectives that have a creative component.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 14 course objectives identified with this criterion. This outcome was also evaluated in EET491 senior design, the department's terminal course and in EET303 a communications course that encompasses knowledge from several analog courses. The design itself and the design process were evaluated in EET 491. Selected exam questions were used in EET303.	The department is strong is this outcome with many relevant course objectives and 75.3 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from EET303 were a 2.6 out of a possible 5. The results from EET491 were a 3.2 as evaluated by faculty and 4 out of a possible 5 as evaluated by students. These results indicate that students struggle with creative solutions.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Function effectively on teams (ABET Criterion 1, item e)	Team performance was evaluated in EET 205.	Laboratories are a strong component of this learning objective. In addition normal classroom activities such as lectures, homework, and group learning activities.	Students work in small groups in most of our laboratories and learn practical group skills. In addition, courses taught in spring 2002 have 9 course objectives related to group activities. Courses EET305 and EET307 have group projects.	A self-assessment was completed by students and the instructor teaching EET 305. Course objectives were evaluated by students. There were two course objectives relating to this criteria for courses taught in spring 2002.	The finding from EET 305 indicate that group scores were acceptable. Students evaluated the effectiveness or their group a 3.9 out of 5. Communications in the group a 4.2 out of 5 and participation a 3.6 out of 5. 93.0 percent of the students strongly agree or agree that they can perform tasks indicated by the course objectives.		

ECET Assessment Summary of the B.S. Degree Program – Spring 2002

1. What general outcomes are you seeking?	**2. What will the student know or be able to do (measurable outcomes)?**	**3a. How will you help students learn it (in class or out of class)**	**3 b. Where will your students learn it?**	**4. How could (do) you measure each of the desired behaviors listed in column 2?**	**5. What are the assessment findings?**	**6. What improvements (and changes) have you made based on assessment findings?**	**7. What are the implications at the campus level?**
ABET Criterion 1, item f; Identify, analyze and solve technical problems.	There are sets of generally accepted problem types used in the discipline.	A large portion of normal classroom activities such as lecture and homework are devoted to teaching this objective. Laboratories also play a strong role in teaching related to this learning objective.	Mastery of discipline related problem solving is primary objective of the departments teaching mission and all courses in this curriculum have this as a primary focus.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were 40 course objectives identified with this criterion. This outcome was also evaluated in EET491 senior design, the department's terminal course. The design itself and the design process were evaluated in EET 491.	The department is strong is this outcome with many relevant course objectives and 77.4 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives. The results from EET303 were a 4.3 out of a possible 5.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Communicate effectively (ABET Criterion 1, item g)	We evaluated based on communications skills that are expected by industry of recent AS graduates.	Students are required to write papers that are returned for corrections. Oral presentations are critiqued.	Students take the required English composition and speech courses. In addition, papers are required in EET490 and EET491.	Oral and written presentations were evaluated in EET 491 senior the department's capstone course. Six course objectives from courses taught in spring were related to communications.	Written communications in EET491 was judged by faculty to be 4 on a base 5. Oral com-munications was judged by a panel to be 4.0/5. 77.4 percent of students indicated they strongly agree or agree that they can perform tasks indicated by the course objectives.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Recognize the need for and possess the ability to pursue lifelong learning (ABET Criterion 1, item h)	Evaluate student's ability to investigate an unfamiliar topic outside of class using global research tools.	We require research projects using technical literature. EET 490-91 requires demonstration of technical competence in state-of-the art project management and project design.	In EET303, EET307, EET360, EET403,EET472, EET490 and EET491.	Student self-assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There were six course objectives identified with this criterion.	The department is strong is this outcome with many relevant course objectives and 74.7 percent of students indicating they strongly agree or agree that they can perform tasks indicated by the course objectives.	The department will evaluate how to more fully cover this criterion in the B.S. program.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Understand professional, ethical and societal responsibilities (ABET Criterion 1, item I).	Students can successfully communicate the many alternative choices.	Ethical case studies are presented in the classroom.	EET491.	There were two course objectives from B.S. courses taught in the spring 2002 semester covering this criteria.	90.6 percent of students indicated they strongly agree or agree that they understand material related to course objectives covering this topic.	This will be better assessed in EET491in the future.	

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Recognize contemporary professional, societal and global issues and be aware of and respect diversity (ABET Criterion 1, item j)	Respect diversity: Increased awareness of individual differences.	Case studies are presented in the classroom.	EET491	There were two course objectives from B.S. courses taught in the spring 2002 semester covering this criteria.	90.6 percent of students indicated they strongly agree or agree that they understand material related to course objectives covering this topic.		

1. What general outcomes are you seeking?	2. What will the student know or be able to do (measurable outcomes)?	3a. How will you help students learn it (in class or out of class)	3 b. Where will your students learn it?	4. How could (do) you measure each of the desired behaviors listed in column 2?	5. What are the assessment findings?	6. What improvements (and changes) have you made based on assessment findings?	7. What are the implications at the campus level?
Have a commitment to quality, timeliness and continuous improvement (ABET Criterion 1, item k)	Timeliness outcomes measured and a rubric for quality will be generated.	Teach project management making use of Gantt charts and other organizational tools.	EET490	Student self assessment of their comprehension of course objectives was measured for courses taught during the spring semester. There was 1 course objective identified with this criterion.	93.8 percent of students indicated they strongly agree or agree that they understand concepts behind the course objective.	In the future the milestone charts will be assessed.	

DEPARTMENT OF MECHANICAL ENGINERING 2002 ASSESSMENT ANNUAL REPORT
Prepared by Hasan Akay, Ramana Pidaparti, and the Faculty of the Department
Spring 2002

1a Program Outcomes	1b Principles of Undergraduate Learning (PUL)	2 Measurable Outcomes	3a Courses Reflecting the Outcomes	3b Mode of Learning/ Teaching Strategies	4 Tools Used for Assessment	5 Assessment Findings	6 Improvements Made	7 Implications at the Campus Level
a. Knowledge of applicable Mathematics and Statistics, and the basic Mechanical Sciences.	2a, 2b, 3a, 3b	Ability to solve basic linear equations using linear algebra, differential equations, probability and Statistics and to apply them in solid and fluid mechanics and heat transfer.	MATH 262, 263 ME 270, 274, 330, 340.	Mode of Teaching -Class Lecture -Labs & Tutorials in class -home work, out of class	-Tests -Home work -Rubrics of ME courses only -Course outcome survey -Satisfaction survey	-Course outcome surveys satisfaction, so far. -There's room for improvement.	-Computer simulation with Matlab in almost all courses -More Statistics and probability required -More tutoring required -Continue to revise and update curriculum	-Math is campus wide interdisciplinary activity

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b. Ability to design and conduct experiments, and to interpret the results or data obtained.	1, 3	From the quality of generated lab reports, showing students able to conduct experiments and analyze data using basic statistics such as regression	ME 272, 310, 314, 340, 372.	-Derivation of theoretical formulas on which experiments are based. -Demonstration of experiments -Illustration of how to use computer in analysis, charting and report utility -Assign lab reports to be written individually, and sometimes in groups.	-Lab reports -Occasional Presentation -Rubrics of ME courses -Course outcome surveys -Satisfaction survey	-Lack of multiple experiment stations -Quantity and quality of experiments need improvement	-Need to upgrade and provide more experiment stations -Standardized repot writing	

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c. Design a system, component, or process to meet desired needs, with specific ability to design mechanical systems and thermal systems	1c, 1d, 1e, 2a, 2b, 2d, 2e, 3b, 3c, 4a, 4c, 5b, 6a, 6b	Students will design technically competent, functional, and socially acceptable mechanical and thermal systems. Students will creatively generate multiple design ideas based on functional decomposition, and evaluate them based on customer requirement.	ME students are required to take the design sequence of ME 262, 372, 462. They also solve design problems in other courses where assigned.	ME 262, 372, and 462 are design courses with specific training in design process, techniques, and implementation. ME262 teaches design process, mechanism design. ME372 teaches machine element design for motion and strength. ME462 is the capstone design course that requires completion of a challenging design project.	Design work, reports and presentations in courses. Ratings of ME462 work by a jury of faculty, professional engineers, and peers. Course outcome surveys, alumni surveys.	The quality of design projects is improving. Design should be introduced early in curriculum. Thermal design opportunities are insufficient. Quality of reporting is inconsistent.	ME414, a new course on thermal design, introduced for Fall 2002. Major revision of ME 262, 372, 462 curriculum. Seminar speakers added in ME462. A standardized reporting format is used.	Design project require more support and resources. Participation in engineering design competitions brings publicity for IUPUI.

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d An ability to function on multidisciplinary teams	**1c, 4c, 5c**	Students will be able to work in multidisciplinary projects .	ENGR 195, ENGR 196, ME 482 and ME 462.	Design teams in ME 462. Group Discussions Project based learning Laboratory experiments	Course outcome surveys. Alumni surveys. ME 462 Design Rubrics Lab and projects reports	More emphasis on team work Room for improvement.	Introduction of multidisciplinary projects in ME 462 capstone design course.	Interaction with other Departments/ Schools (ECE, Science, Medicine, Education and Dentistry)

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e. The ability to identify and formulate engineering problems and the ability to solve problems.	1b, 1d, 2a-e, 3a, 3c, 4a-c	Students will be able to translate a need into a design project. Starting with textbook problems, students will be able translate word problem into an engineering solution. This outcome is assessed through questions in homework, quiz, test, and project.	ME students are required to take ENGR197, and ME200, 262, 270, 272, 274, 310, 314, 330, 340, 372, 462 and 482.	ENGR197, and ME200, 262, 270, 272, 274, 310, 314, 330, 340, 372, 462 and 482 are traditional lecture type classes plus lab exercise where instructors lecture on the subject, students solve homework problems. In design courses, instructors teach students how to turn customer requirements into a product Students design the product.	Course outcome survey Exit survey Satisfaction survey Exam Project report Presentation		Tutor services for basic engineering science courses	

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f Understand professional and ethical responsibilities	**1b, 2a, 2b, 2e, 3b, 3c, 4b, 5b, 5c and 6a**	Students should be able to accept professional and ethical responsibilities for their deeds .	ME 401 and ME 462.	Professional speakers in ME 462. Case studies Participation in professional society meetings	Course outcome surveys. Alumni surveys. Course evaluations Fundamental of Engineering (FE) Exam	Room for improvement.	Introduction of more speakers and case studies	More activities outside the Department

1a Program Outcomes	1b Principles of Undergraduate Learning (PUL)	2 Measurable Outcomes	3a Courses Reflecting the Outcomes	3b Mode of Learning/ Teaching Strategies	4 Tools Used for Assessment	5 Assessment Findings	6 Improvements Made	7 Implications at the Campus Level
g Communicate effectively in writing and orally.	**1a, 1c**	Students will be able to write effective lab and project reports. Students will be able to give good oral presentations of work. Students will be able to prepare effective posters to demonstrate work.	ENGR 195, ME 262, ME 274, ME 310, ME 314, ME 340, ME 372, ME 462, ME 482, TCM 360	Traditional lectures. Project reports in ME 262, ME 372, ME 462, ME 482. Lab reports in ME 274, ME 340, ME 310, ME 314, ME 340, ME 372. Presentations in ENGR 195, ME 462, TCM 360.	Course outcomes surveys. Assessment rubrics in lab and project reports. Alumni surveys.	Course outcomes surveys indicate satisfactory performance in several courses. Alumni surveys indicate the need for improvement. Assessment rubrics in key courses indicate satisfactory performance.	Standardized lab report format and grading rubrics. Standardized project report format and grading rubrics. Introduced written and oral communication at an earlier stage into the curriculum than before. Exemplary student project samples are made available on the department Web site.	More exposure of the student work.

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h Understand the impact of engineering solutions in a global and societal context through broad education.	**2c, 4b, 5a, 5b, 6a, 6b**	Students should be aware of environmental and societal impact of their engineering solutions. Students should consider safety aspects of their designs. Students should be aware of global issues. Graduates should be more effective in public policy making.	All general education electives taken from liberal arts (17 credit hours). ENGR 195, ME 372, ME 401, ME 462.	Traditional lectures. Seminar speakers on the subject. Group discussions. Presentations in ENGR 195. Presentations, essays, and discussions in ME 401. Study of design impacts on environment, safety, and society in ME 372 and 462. Lectures and essays in general education courses.	Course outcomes surveys. Assessment rubrics in project reports. Essays required on the topic in major project reports Essays in ME 401 and general education courses.	More awareness to be created with emphasis in more courses. There is a need to make the general education courses restricted to these general topics.	Created assessment methods to tract the student response in ME 401, ME 372, ME 462 courses. Plan to collaborate with liberal arts to select and assess a set of courses addressing these topics.	More collaboration with liberal arts and business schools. Interdisciplinary activities. Graduates who are effective in public policy making.

1a Program Outcomes	1b Principles of Undergraduate Learning (PUL)	2 Measurable Outcomes	3a Courses Reflecting the Outcomes	3b Mode of Learning/ Teaching Strategies	4 Tools Used for Assessment	5 Assessment Findings	6 Improvements Made	7 Implications at the Campus Level
i Recognize the need to engage in lifelong learning.	**1b**	Students will realize the importance of continuing education to keep-up with ever changing technology after graduation. Students will view graduate school as an important part of professional growth. Student will plan early to pursue advanced degrees.	MSE 345, TCM 360, and ME 462.	Seminar speakers in ME 462. Speakers of student chapters of professional societies. Emphasis of continuing education in various courses. Emphasis on FE (student in-training) exam in senior courses.	Course outcome surveys. Alumni surveys. ME 462 final project assessment.	Course outcomes surveys indicate satisfactory performance. Assessment rubric in ME 462 indicates satisfactory performance with room to improve. Very few students sign-up for FE exam, because of time crunch in senior year and no immediate incentive.	Added a seminar component to ME 462 capstone design course. Emphasized more on FE exams and graduate studies. More speakers are invited to stress on the topic.	Growth of graduate programs. More IUPUI graduates in the state with professional licensing.

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j. Demonstrate knowledge of contemporary issues	3c, 4b, 5a, 5b, 6a	Student work shows awareness of contemporary issues. Graduates and employers report of satisfaction with knowledge of contemporary issues	ME 401, ECON201 and general education electives	ME 401 covers ethical and related issues. General education courses including ECON201 cover contemporary issues. Study of design impacts on environment, safety, and society in ME 372 and 462.	Homework, discussions and exams in ME401. Course outcome surveys. Alumni and employer surveys. Incorporation of environmental, safety, and social impact considerations in ME462 design project.	Anecdotal evidence that students are aware of most issues, but insufficient coordination to ensure coverage of important issues.	Plan to require a general education course that covers contemporary issues relevant to engineering.	Cooperation needed between engineering and liberal arts departments.

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k. The ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	1e, 3b-c, 4a	Completion of assigned projects using various technologies and engineering tools.	ENGR 195, 196, 197 ME 262, 272, 330, 340, 372, 310, 314, 482 and most of the ME electives.	ENGR 195, 196, 197 ME 262, 272, 340, 372, 310, 314, and 482 have labs where instructors lecture on the subject, students practice on the technologies. Numerical simulations are introduced in ME330 and most ME Electives.	Student lab reports, project reports and homework assignments were assessed. Completion of assigned tasks was assessed using a departmental lab report assessment rubrics.	Adequate tools are covered.	Tools are introduced at earlier stages so that they can be well practiced.	

MECHANICAL ENGINEERING TECHNOLOGY 2002 ASSESSMENT REPORT

Prepared by Sally Frettinger-Devor and Kenneth Rennels

May 22, 2002

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
Photo design and production with the world's leading image processing and enhancement software for print and Web. Digital images are produced, modified and retouched through assignments stressing practical productivity techniques as well as expressive creativity. Topics such as composition, background removel, image swapping, colorizing, type creation and additive special effects are covered. This course gives in-depth instruction in the use and applications of image manipulation as it applies to advertising, print and multimedia.	Demonstrate differences between vector and raster illustrations	TBD--See attached memo		CGT 211	Projects, lab exercises, quizzes, homework assignments+F17	TBD	TBD	AS/BS CGT
	Demonstrate bitmap imaging attributes							
	Application of common imaging application features (layers, channels, paths, filters, color adjustment and correction tools)							
	Skill in using raster graphic display and print technologies							
	Demonstrate understanding and knowledtge of color theory, color models and color systems							
	Apply vector to raster conversion methods, compression technologies							
	Demonstrate proficiency in texture generation, photographic reproduction and manipulation, interpretive imaging, scientific/technical imaging and self-promotion							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
Introduction to academic and professional opportunities in computer graphics. Topics include: computer graphics terminology, graphics software, digital resume and portfolio.	Learn about various CGT courses	1b,c, e, 2e, 3, 4b, 5, 6		CGT 100		TBD	TBD	AS/BS CGT
	Introduction to portfolios							
	Demonstrate general knowledge of industry							
	Demonstrate ability to develop a resume				Resume and cover letter assignment			
	Demonstrate general knowledge of a variety of different graphic programs.							
Color theory, surface analysis, rendering techniques as related to vector-based illustrations.	Demonstrate understanding of nature of digital color in both additive and subtractive models			CGT 216	Projects, lab exercise, homework assignments, quizzes, final project	TBD	TBD	AS/BS CGT
	Specify color in RGB, HLS, CMYK, and Pantone systems							
	Distinguish suitability of vector and or raster imaging applications for particular illustration tasks.							
	Distinguish between file format choices related to storage, display and transportability of graphic files.							
	Demonstrate skill in an industry-standard vector illustration tool.							
	Secure high-quality color output from service bureaus							
	Apply principles of light, shade and shadow as they apply vector renderings							
	Demonstrate differences between axonometric and perspective drawings							
	Demonstrate proper lighting considerations for mixing different images.							
Introduction of the knowledge base on which digital animation and spatial graphics technology are founded and developed. Emphasis will be on developing a working knowledge of the mechanics of 3D geometric formats, spline based modeling with polygon modeling, rendering methods, hierarchical linking, and kinematic fundamentals.	Demonstrate strategic planning methods to optomize geometry creation for efficiency			CGT 241	Projects, lab exercises, final project	TBD	TBD	BS CGT
	Create and modify complex shapes using 3D stuiod Max							
	Ability to use vertices, grids and other mesh controls							
	Predict and accurately place lights and cameras within a 3DS scene							
	Ability to use materials editor to modify existing materials and create unique ones							
	Ability to animate objects over a specific period of time							
	Apply design parameters to achieve a pre-defined animation outcome							
	Elicit emotions from the viewer through the use of sound, timing and special effects							
Development of working knowledge of perspective display of three-dimensional models and the resulting effects of projected light sources on shade, shadow, color, texture, and atmospheric erffects in architecture, product illustration and animation with focus on commerical graphic applications	Demonstrate knowledge of physical and virtual technology of lighting			CGT 340	Photographs, papers, projects, final projects.	TBD	TBD	AS CGT
	Knowledge of vocabulary and graphical convections of lighting design.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Desmonstrate knowledge of body of work that lighting design is based upon.							
Capstone project in computer graphics technology	Creation and management of media assets per proposal			CGT 416	Final Project	80% Succe ssfully comple te per criteria	Yes	BSCGT
Covers the use of digital technologies for video and audio focused toward use in multimedia, hypermedia and animation products. Students examine the methods for creating, sampling, and storing digital video and digital audio and the contraints placed on these media assets when used for media based products. Emphasis is placed upon the technology of digital video and audio including formats, data rates, compressors, and the advantages and disadvantages of the different technologies.	Ability to integrate the use of multiple vide and audio tracks			CGT 346	Labs, projects, final project	TBD	TBD	BS CGT
	Incorporate transitions effectively to create seamless change between elements							
	Ability to use multiple layers to enhance the visual experience of the viewer.							
	Recycle movie elements with Alpha Channels							
	Composite blue screen segments to integrate live and computer-generated scenes.							
	Ability to create traveling Mattes and other special effects							
	Demonstrated techniques in advanced video compression							
Introduce the many facets of interactive multimedia design and production. Students introduced to interation-based authoring programs used for information delivery with special attention focused on the integration of various media assets for communication. Concentration on the storage, management and retrieval of media assets in a production environment.	Demonstrate knowledge of disciplines involved with multimedia development			CGT 351	Assignments, labs, exams, projects	TBD	TBD	BS CGT
	Knowledge of the five major steps in multimedia development							
	Knowledge of the current standards and guidelines for multimedia development and delivery							
	Utilization of analog and digital audio in quthoring programs							
	Ability to incorporate vide and animation into interactive multimedia							
	Know fundamental principles behind good interface design							
	Basic knowledge of how to program interactivity into a multimedia product.							
	Ability to list major points of concern in application development							
	Knowledge of distribution and deployement concerned with multimedia							
	Demonstrate knowledge of legal issues involved with multimedia production and delivery							
A continuation of study of the multimedia development process, with an emphasis in game development. Integration of text, graphics, sound, video and animation into authoring software to entertain, persuade or educate.	Logic development for good game play			TECH 581	Projects, f+F224inal Project	TBD	TBD	
	Demonstrate understanding of of standards and guidelines for multimedia development and delivery							
	Demonstrate knowledge of the fundamental principles behind good interface design							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Capability to oprogram interactivly into a multimedia product							
	Incorporate video and animation into interactive multimedia projects							
	Ability to compile and compress applications							
	Knowledge of distribution and deployement concerned with multimedia							
	Demonstrate knowledge of legal issues involved with multimedia production and delivery							
Basic course in electrical and electronic drafting, utilizing multiview and isometric drawing, sectioning, and dimensioning practices. Documentation of design through schematic diagrams, wiring diagrams, and printed circuit board layout. Application of graphics standards for electronic, power, and industrial control circuitry.	Ability to utilize symbols, orthographic projection, sketching, pictorial representation and related practices in the interpretation of electrical fabrication and electronic industrial prints.			CGT 120	Laboratory assignments, final project	TBD	TBD	AS CGT
	Ability to visualize spatial three-dimensional objects on a two-dimensional drawing surface							
	Master basic principles involved in executing and dimensioning orthographic and pictorial drawings							
	Ability to execute block and logic diagrams							
	Ability to execute schematic diagrams							
	Ability to execute printed curcuit board details and assemblies							
	Ability to execute CAD of schematics and printed curcuit boards							
	Master techniques needed to fabricate a printed circuit board							
Core introductory computer graphics ourse that provides entry level experiences in geometric modeling. Students develop geometric analysis and modeling construction strategies and processes to produce accurate computer models for graphic visualization and communication using AutoCAD200i and Thinoceros software	Distringuish between wireframe, surface and solid modeling and their applications to various communicative problems and tasks.			CGT 116	Drawing assignments, exams, final projects in both software packages.	TBD	TBD	AS/BS CGT
	Proficiency in 3D models using AutoCAD and Rhino software							
	Apply 2D and 3D geometric entities in graphic communication							
	Developed 3D spacial environment understanding and mental visualization ability.							
	Ability to create 3D computer models from 2D multiview engineering drawings							
	Extract 2D orthographic, section and auxiliary views from 3D models for realistic look							
	Ability to add virtual lighting to 3D models and environments to create photorealistic renderings							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
Design and analysis of statistical process control charts and industrial sampling plans.	Calculate basic descriptive statistics	1a,b,d,2a,c,4b,c		IET 454	Homework, projects, exams	80% pass Black Belt Cetification Exam	TBD: First Exam given in the fall.	Certificate in Quality or BS MET
	Know the history of quality management							
	Ability to calculate simple probabilities based on manufacturing and design related probability distributions using formulas and tables							
	Calculate and plot variable and attribute charts for long and short run situations							
	Assess control charts based on Cpk and SPC chart rules							
	Construct OC, AOQ, and ATI curves using tablesConstruct a sampling plan using ANSI 1.4							
	Calculate steady state failure results using tables and formulas							
	Relate the economocis of quality and continuous improvement principles to quality							
Study of force systems, resultants and equilibrium, trusses, frames, centroids of areas, and center of gravity of bodies.	Demonstrate use of SI units and US Customary system of Units	1a,b,d,2d,4a		MET 111	Graduation Exam	70% average score	No	AS/BS MET
	Apply the parallelogram law to determine the resultant of two forces							
	Resolve a force into two components using the parallelogram law							
	Resolve two or more forces into x and y components and determine the resultant of forces by summing the components							
	Determine the unknown forces acting on a particle in equilibrium by applying the equilibrium equations							
	Determine the resultant of three or more space forces by summing their rectangular components							
	Determine three unknown forces acting on a particle in space, that is in equilibrium, by applying the equilibrium equations.							
	Apply the principle of the transmissibility of forces.							
	Apply Varigon's Theorem							
	Determine the moment of a couple							
	Determine the resultant of a non-concurent coplanar force system							
	Construct free-body diagrams							
	Apply the quilibrium equations to free-body diagrams to determine unknown forces.							
	Determine the center of gravity of a two-dimensional body.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Determine the support reactions of beams supporting distributed loads.							
	Demonstrate method of joints and the method of sections to determine the load in each truss member							
	Determine the forces acting in frames and machines							
	Determine the force required to place a system of wedges in equilibrium by applying the laws of dry friction and the angle of friction							
	Determine the moment of inertia of an area							
	Determine the radius of gyration of an area							
Ability to analyze motions, displacements, velocities, instant centers, cams, linkages and gears	Define link, frame, mechanism, and machine			MET 112	TBD			AS/BS CGT
	Able to identify the kinematic symbols for fixed surface, pin joint, sliding motion on a fixed surface, relative sliding motion, link, gear, pulley, flywheel, and friction wheel							
	Sketch kinematic diagrms							
	Identify link names of four-bar linkages							
	Identify six basic types of four-bar linkages							
	Define top and bottom dead center position, pairing, kinematic chain, structure, inversion							
	Define the three types of place motion							
	Students can identify the five fundamental machines							
	Determine the class of four-bar linkage using the John A. Hrones test criteria							
	Identify basic mechanisms							
	Identify type of motion between the links of a mechanism							
	calculate stroke of slider-crank mechanisms							
	calculate timing angles, time, and displacements of four-bar linkages							
	Identify the methods of transmitting motion in mechanical mechanicms							
	Synthesize simple four-bar linkages							
	Calculate the transmission angle in a four-bar linkage							
	Identify the line of transmission in simple mechanisms							
	Define couple point and coupler curve							
	Define rolling contact							
	Synthesize spur gear and friction wheel drives							
	Define and calculate angular distance and angular displacement							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Calculate linear and angular velocity in simple mechanisms using the vector component, instant center, and relative velocity methods							
	Calculate linear and angular acceleration in simple mechanisms							
	Identify the different types of cams and cam followers							
	Define cam terminology							
	Determine prime circle radius, pressure angle, and cam follower offset using monographs.							
Applications of engineering mechanics are introduced, based on an elementary expansion of Mewtonian physics as applied to static and dynamic force systems. Internal stresses and strains produced by these forces in selected machine elements are condisered.	Sum forces in vertical and horizontal directions			MET 212	TBD: Electives aren't being actively assessed at this point.			AS/BS MET
	Construct free-body diagrams							
	Calculate mechanical advantage of a pulley mechanism							
	Define tension and recognize tension numbers							
	Define stress and strain							
	Calculate normal stress							
	Determine stress concentration factors from graphs by Peterson							
	Distinguish between stress and pressure							
	Define yield strength							
	Distinguish between elasticity and plasticity							
	Calculate elongation using the definition of Young's modulus							
	Define compression							
	Calculate the normal stress in two materials that comprise a short column							
	Calculate thermal stress							
	Define shear							
	Calculate shear stress							
	Define Poisson's ratio							
	define torsion							
	Calculate the moment of a force							
	Define couple and calculate it's moment							
	Calculate the shear stress in a circular shaft due to a torsional load							
	Calculate the angle of twist in a circular shaft due to a torsional load							
	Apply the parallelogram law to determin the resultant of two forces							
	Resolve a force into two components using the parallelogram law							
	Resolve two or more forces into x and y components and determine the resultant of the forces by summing the components							
	Apply the equilibrium equations to free-body diagrms to determine unknown forces							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Students can calculate the support reactions for beams supporting concentrated and distributed load							
	Calculate the ehar forces and bending moments in beams							
	Calculate the location of the centroid of beams having built-up cross sections							
	Calculate the bending stress in beams							
	Calculate the shear stress in a beam							
	Construct shear and moment diagrams							
Knowledge in tool design methods, tooling materials and heat treatment; design of cutting tools; gage design' design of jigs and fixtures; design of tools for CNC machines; tool design using CAD systems. Tool design term projects using CAD systems required.	Define the process of tool design			CIMT 245	Lab projects, final exam	TBD See Memo		BS CIMT
	Select appropriate type of tool steel for tooling components'							
	Ability to specify the correct type of drill bushing for different drilling applications							
	specify the correct chip clearance for drilling applications							
	Determine the appropriate drill bushing length for different size drills							
	Define the function of dowel pins and fasteners in tool design							
	Define the purpose and function of a workholder							
	Define the three types of workpiece location that must be considered when designing a workholder							
	Apply the 3-2-1 method of locating a workpiece when designing a workholder							
	Design locating components for workholders							
	Determine when to incorporate jackscrews and jackpins in workholders							
	Select the appropriate workpiece surfaces for location whern designing a workholder							
	Design diamond pin locators							
	Select the appropriate type of clamping mechanism when designing a workholder							
	Recognixze different types of jig designs and select the appropriate design for the machining operation to be performed							
	Design a simple plate drill jig							
	Complete title blocks and bill of materials on tool drawings							
	Recognize the different types of fixture designs and select the appropriate design for the machining operation to be performed							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Design a simple milling fixture							
	Recognize the different types of power presses and select the appropriate type of press for various press operations							
	Define the basic mechanical components of a die							
	Distinguish between the principal types of die designs such as progressive and compound							
	Define the major pressowrking oeprations							
	Calculate the center of pressure in a die							
	Specify the proper punch and die clearance							
	Calculate the size of a punch and its corresponding die cavity for a punching operation							
	calculate press tonnage requirements							
	Calculate stripping pressure							
	Calculate flat blank length for a formed part having simple bends.							
Industrial robot types and their applications in manufacturing. Safety, application limitations, and economic justification will be considered. Automated material handling equipment will be reviewed. Laboratory exercises will involve programming an educational robot using a teach pendant and microcomputers	Define the basic elements in a robot system	1c,e, 2a,2d,2e,3,4a		CIMT 260	TBD--Electives are not part of the first phase assessment process.	TBD		BS CIMT
	Define the position and orientation motions of a mechanical arm							
	Define resolution and repeatability as applied to a robotic arm							
	Define work envelope as applied to a robotic arm							
	Define accuracy as applied to a robotic arm							
	Define degree of freedom of a mechnaical arm							
	Write a task point graph for programming a robot							
	Use a teach pendant to program a robot							
	Define the different types of robot arms based on arm geometry							
	Define the types of robot axes motion							
	Select an appropriate type of arm geometry for such applications as material handling, assembly operations, machine tending, spray painting, palletizing,grinding, and welding							
	Define the three types of robot power sources and the advantages and disadvantages of each							
	Define the two primary control techniques							
	Distinguish between the four types of path control used on industrial robots							
	Use the Robotalk language to simulate programming a robotic work cell							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Distinguish between different types of end of arm tooling and its appropriate applications							
	Select the appropriate sensor to monitor work cell operation							
This course surveys the manufacturing processes and tools commonly used to convert cast, forged, molded, and wrought materials into finished products. It includes the basic mechanisms of material removal, measurement, quality control, assembly processes, safety, process planning, and automated manufacturing.	Students will prepare laboratory reports in proper format.	PUL1a.		MET 242	TBD			AS/BS CIMT
	Students will demonstrate knowledge of basic material removal processes	PUL1b						
	Students will demonstrate knowledge of non-traditional material removal processes	PUL1b						
	Students will demonstrate knowledge of cutting tool material and geometry characteristics.	PUL1b						
	Students will demonstrate knowledge of metal cutting theory.	PUL1d.						
	Students will be able to calculate machining parameters, material removal rates, machining times and machine horsepower requirements.	PUL1e						
	Students will understand the use of standard machining parameter reference data including CutData software and materials reference books.	PUL4a.						
	Students will demonstrate knowledge of machining practices through laboratory projects.	PUL4a.						
An overview of structures, properties, and applications of metals, polymers, ceramics, and composites commonly used in industry is presented. Problem-solving skills are developed in the areas of materials selection, evaluation, measurement, and testing.	To familiarize the student with basic materials and their properties and, in addition, an understanding of the primary processes of manufacturing. Although this is a survey course, it must provide the background needed for subsequent courses in the curriculum.	1a,b,c,2d,4a		MET 141				AS/BS CIMT
Basic casting, forming, and joining processes are surveyed. The course emphasizes the selection and application of various processes.	This class is designed to introduce 3 of the 4 categories of manufacturing processes (joining, casting, and forming), as the first in a series of two classes. (MET 142 and MET 242) Emphasis is placed on the application of these processes in the manufacturing of everyday products, the advantages and disadvantages of each process, and hands-on experience with some of the equipment used.	1a,b,c,e,2d,e,3,4a ,5		MET 142				AS/BS CIMT
A survey of casting processes of past, present, and future. Special emphasis is placed on developing problem solving skills with relation to using cast parts in manufacturing. Students will gain knowledge from lectures, reading assignments, audiovisual presentations, demonstrations, and field trips Each student will also be required to research	To introduce students to a wide variety of cast metals operations			MET 240				BS CIMT
	To give them hands on experiences with metals and molding materials, and techniques used in industry today.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
and write a five page paper on some aspect of the foundry industry or to give a demonstration in the laboratory.	Be required to demonstrate their ability to make decisions based on knowledge they have acquired in class as it applies to actual metal casting situations with regard to economic, ecological and human relations considerations.							
This course surveys the manufacturing processes and tools commonly used to convert cast, forged, molded, and wrought materials into finished products. It includes the basic mechanisms of material removal, measurement, quality control, assembly processes, safety, process planning, and automated manufacturing.	The goals of this course are to introduce the students to the basic machine tools of industry and to give them first hand experiences in preparing and performing many of the basic operations. The students will also be instructed in estimating costs of machine operations and determining their logical sequence of operations.	1a, 1b, 1d, 1e, 2c, 2d, 3, 4a		MET 242				
Metals and polymers are studied. Topics include the bonding of atoms; the structures of crystals and polymers; the coldworking, alloying, and heat treating of metals; and the physical behavior of plastics. Course emphasis is on the development and control of materials properties to meet engineering requirements and specifications.	Atomic structure: nucleus, electron rings, protons, neutrons, and electrons	1a,1b,1c,2a,2d,2e		MET 344				As/BS MET
	Crystalline structure of metals: 3 most common lattices – FCC, BCC, and CPH. Properties of metals possessing these lattice structures.							
	Geometric properties of lattices, Miller Indices, close-packed planes, preferred slip planes and direction							
	Cold-working: How it affects a metals mechanical properties, it's influence on grain size and recrystallization.							
	Annealing: Stages of annealing, purposes of annealing, examples of annealing processes							
	Alloys: Definition, types of binary alloy systems, rules of solubility, phases							
	Phase diagrams: How to read diagram, identify liquidus, solidus, and solvus lines, identify reactions such as eutectic and eutectoid, be able to determine percent composition of mixture phases as well as relative amount of each phase.							
A survey of steam power plants, internal combustion engines, heat pumps and refrigeration. Theory of Thermodynamics and heat transfer	Understand thermodynamics as the study of energy and its conversion from one form to another.	1a,1b,1c,1d,1e,2a,2d,2e,3,4b		MET 220	TBD			As/BS MET
	Know how to measure and utilize thermodynamic properties of matter in both English and SI units.							
	Understand pressure in terms of force in a column of fluid.							
	Understand the concept of work and heat as energy forms in transition and how to calculate work in terms of properties of a substance.							
	Differentiate between closed, or non-flow, systems and open, or flow, systems.							
	Understand and be able to apply the first and second laws of thermodynamics for both open and closed systems.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Obtain values for the properties internal energy, enthalpy and entropy by calculation and from tabulated data.							
	Apply the continuity equation for steady flow systems and understand how this is utilized with the energy equation derived from the first law.							
	Understand specific heat and how it is derived from thermodynamic properties.							
	Derive work and heat for typical thermodynamic processes.							
	Analyze heat engine cycles for work and power output and determine the efficiency of the cycles.							
	Understand the three phases of matter and be able to determine the properties of multiphase fluids.							
	Utilize thermodynamic charts and tables and be able to describe various processes on such charts.							
	Understand the concept of an ideal gas and the governing relationships for properties of gases.							
	Analyze a common refrigeration cycle with the aid of tables and charts and determine the coefficient of performance of the cycle.							
	Understand the three mechanisms of heat transfer and be able to calculate heat transfer rates for each mechanism individually and in combination.							
	Determine the characteristics for simple heat exchangers.							
	Write and present a summary research paper on a form of energy conversion not covered in the formal portion of the course.							
A study of the development, transmission, and use of power through fluid power cirtuits and controls	Understand the purposes, applications and advantages of fluid power using hydraulics and/or pneumatics.	1a, 1b, 1c, 1d, 1e, 2a, 2d,		MET 230	Graduate Exam	70% average score	No	As/BS MET
	Define and measure key properties of working fluids in both English and SI units.							
	Understand the requirements for fluid power fluids and components.							
	Understand the relationship between pressure and force in a fluid power system.							
	Develop and apply the energy and continuity equations to fluid systems.							
	Calculate hydraulic horsepower and determine the power requirements of fluid systems.							
	Determine the required sizes of pipes and tubes to carry fluid in a fluid power system.							
	Understand the difference between laminar and turbulent flow and be able to determine which type defines a particular fluid system.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Calculate the Reynolds Number and understand its significance in determining frictional losses in pipes, valves and fittings of fluid power systems.							
	Understand the operation of various positive displacement pumps and how these differ from other types of fluid pumps.							
	Understand the operation of pressure boosters and intensifiers.							
	Understand the operation of fluid power actuators, hydraulic and pneumatic cylinders, and hydraulic motors.							
	Determine torque and power relationships in hydraulic pumps and motors, their							
	efficiencies, and how torque and power are related to pressure and flow of the fluid							
	Understand the usage of various directional control valves, pressure control valves and flow control valves, and how to select appropriate components.							
	Understand how various fluid power systems operate and how to analyze their performance.							
	Understand the function of accumulators and receivers and how to size them.							
	Understand the factors involved and the components used to insure fluid power system maintenance and safety.							
	Calculate the temperature rise in a fluid power system due to energy losses and how this temperature can be controlled.							
	Understand and apply the perfect gas laws to pneumatic systems.							
	Determine the air pressure losses through pneumatic pipelines and the air flow rates through orifices and nozzles.							
The fundamentals of thermodynamics including application of the first and second laws, enthalpy, entropy, and reversible and irreversible processes. Analysis of power cycles and gas turbines.	Understand the concept of a system, both closed and open, and the properties that define the state of a system in both English and SI units	1a, 1b, 1c, 1d, 1e, 2a, 2d, 3		MET 320	Graduate Exam	70% average score	NO	BS MET
	Determine pressure as related to a column of liquid and understand the difference between absolute and gage pressure.							
	Understand the absolute temperature scale and the conversion to it from the common scale in both English and SI units.							
	Understand and apply the first and second laws of thermodynamics for both open and closed systems.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Apply the continuity equation for steady flow systems.							
	Understand the relationship of heat and other forms of energy including potential, kinetic and internal, as well as work.							
	Calculate the work of a system based on the relationship of pressure and volume using integral calculus.							
	Determine the properties of steam using tables and show steam processes on thermodynamic diagrams.							
	Understand the ideal gas laws and how they are applied. Understand the concept of specific heat of an ideal gas.							
Design of plumbing systems, includes losses in pipes, fittings, nozzles, orifices, etc. Includes steam, water, and oil systems. Piping handbooks and catalogs are utilized in conjunction with the State of Indiana Plumbing Code.	Know the characteristics of common piping materials and be able to select the correct material for a particular application			MET 340	TBD			BS MET
	Know the major components of a sanitary piping system.							
	Design and size a sanitary piping system, waste and vent.							
	Design and size a cold water piping system.							
	Design and size a hot water piping system.							
	Analyze the performance characteristics of pumps.							
	Select and size pumps used to recirculate and boost water pressure.							
	Select and size steam piping used in plumbing systems.							
	Learn national and local plumbing codes and be able to apply them to the design of plumbing systems.							
The fundamentals of fluid mechanics, including properties of fluids, pressure, hydrostatic force on submerged areas; kinematics and dynamics of fluid flow; friction and sizing of pipes; selection of pumps.	Differentiate between a gas and a liquid and understand the basic properties of fluids in both English and SI units.	1a, 1b,1c,1d, 1e, 2a, 2d		MET 350	TBD--Elective			BS MET
	Understand the concept of dynamic and kinematic viscosity.							
	Understand the concept of manometry and how pressure is related to the height of a column of liquid, both absolute and gage values.							
	Determine the forces on partially and fully submerged plane surfaces and their line of action.							
	Understand the concept of buoyancy and stability; be able to locate the metacenter of a floating body so as to determine its stability.							
	Understand the principle of continuity for steady flow in conduits.							
	Apply the principle of conservation of energy for fluid flow systems.							
	Understand the concept of fluid head and be able to apply the Bernoulli equation.							
	Understand Torricelli's theorem and be able to analyze the emptying of a liquid from a tank with a falling head.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Understand the concept of laminar and turbulent flows and be able to determine the Reynolds number of flowing fluids through both circular and non-circular pipes.							
	Analyze energy losses in fluid flow systems that include pumps, turbines, and hydraulic motors using Darcy's equation and the Moody chart.							
	Analyze series and parallel pipe systems to determine flow rates, pipe sizes and energy losses or additions.							
	Understand the principles of flow measurement, how flowmeters operate and how to select an appropriate flowmeter.							
	Understand how various types of pumps operate and how to select the appropriate pump for various flow situations.							
	Design a piping system including a pump to provide a given flow rate for a particular system geometry.							
	Compute the forces on stationary and moving objects due to fluids in motion using impulse-momentum principles.							
	Understand the concept of lift and drag and differentiate between pressure and friction drag.							
	Determine the drag coefficients and forces on both stationary bodies in fluid flow and objects moving through a stationary fluid.							
	Describe the characteristics of fans, blowers and compressors.							
	Compute the flow rate of gases through nozzles and ducts and determine the energy losses in an air distribution system.							
Investigation of basics required to design heating, ventilating and air conditioning systems. Heat gain and loss, humidification, duct design, equipment selection and solar heating are included. Codes and standards are emphasized.	Determine the properties of moist air using the psychrometric chart.			MET 360	TBD--Elective			BS MET
	Plot an air conditioning process on a psychrometric chart.							
	Identify and understand the operation of several types of air conditioning systems.							
	Determine building loads and operational requirements.							
	Calculate heating and cooling loads both manually and using computer programs.							
	Design and size an air distribution system.							
	Select and size water piping for chilled water, hot water and steam systems.							
	Select and size pumps, fans and blowers using performance charts.							
	Analyze the thermodynamics of the vapor compression cycle for refrigeration.							
	Determine the heat transfer rates and the coefficient of performance of a heat pump and a cooling system.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Determine the efficiency of a heating system.							
	Select the best refrigerant based on properties.							
	Design and present a complete air conditioning system for a small building as a semester project.							
A study of the principles and practices of selling technical products and/or services. The course covers product knowledge, buying motives, the ten phases of a sale, ethical and legal aspects, in-company promotion of new products, and career opportunities in technical sales. Utilizes role playing	Understand the concepts of selling and the elements of a career in sales.			MET 374	TBD--Elective			BS MET
	Understand the ten steps in the sales process.							
	Know the elements of marketing and the importance of marketing and personal selling to an industrial organization.							
	Understand the social, ethical and legal aspects of sales.							
	Explain the difference between features, advantages and benefits and know why benefits is the most important factor in the buying decision.							
	Understand Maslow's hierarchy of needs and why people buy.							
	Understand the elements of verbal and non-verbal communication and know the importance of non-verbal signals.							
	Improve listening skills and the usage of questions.							
	Know what kinds of sales knowledge are required in selling technical products.							
	Understand the concepts of value, markup and return on investment.							
	Describe prospecting methods and understand how to plan a sales call based on the prospect's five mental steps in buying.							
	Understand the various methods of making a sales presentation and how to select the best approach.							
	Recognize the various personality types of prospects and how to tailor the presentation to each.							
	Understand the various questioning techniques and which ones to use in particular situations.							
	Understand the sales presentation mix and how to utilize each element.							
	Use a trial close to elicit objections and be able to respond to various kinds of objections.							
	Explain when to close a sale and utilize various closing techniques.							
	Understand the concept of customer service and how to build customer retention and account penetration.							
	Understand the concept of time and territory management and the need to determine the salesperson's breakeven point in sales volume.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Apply the principles of salespersonship to resume preparation and the seeking of employment.							
	Utilize role play to provide experience in making a sales presentation.							
Introduction to the basic concepts and terminology of instruments. Procedures and techniques essential to industrial measurement and transmission of data. Emphasis on pressure, flow, temperature, and level measurements, and computer control.	Understand the objectives of taking measurements and the importance of correct interpretation of the results.	1a,b,c,d,e,2a,2c,2d,2e,3,4a,4c		MET 384	TBD--Elective			BSMET
	Understand how static and dynamic measurements differ, how each should be taken, and the importance of calibration of the measuring device.							
	Know the standard units of measurement in both English and SI systems, and how to express values in the appropriate number of significant digits.							
	Understand the concept of total error as made up of bias and precision error, and how this is related to the true error using the concept of measurement uncertainty.							
	Understand how errors arise in common measurement systems due to both equipment and human sources.							
	Calculate measurement uncertainty using statistical principles for both small and large samples, and understand how uncertainty can be propagated.							
	Fit the best straight line through a series of data points and evaluate the goodness of fit.							
	Understand the basic response characteristics of dynamic measurement systems.							
	Understand how resistance and Hall effect transducers function.							
	Measure stress and strain in materials and combine strain gages in Wheatstone bridge and rosette arrangements to obtain mechanical measurements.							
	Understand the principles of measuring forces and torques.							
	Take pressure measurements in both static and dynamic systems and calibrate pressure measuring devices.							
	Take fluid flow measurements and calibrate flowmeters. Understand the concept of hysteresis in flow calibration.							
	Take temperature measurements, calibrate such devices, and select the correct device for a particular situation.							
	Evaluate errors in temperature measurements due to heat transfer effects.							
	Understand the characteristics of sound, measure sound pressure level and intensity, and calculate the attenuation of sound with distance.							

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
	Understand the theory of PID control from a physical standpoint and apply the theory to both PLC's and PC's in the laboratory.							
	Set PID control parameters to effect desired responses in mechanical systems.							
	Perform laboratory experiments in teams with proper procedures and prepare laboratory reports in a concise and effective manner.							
Survey of contemporary quality concepts and techniques. Topics include total quality management philosophy, process improvement, vendor certification, quality systems, ISO 9000 documentation, electronics industry quality applications, SPC, introduction to design of experiements, basic reliability concepts, testing and related topics. Team approaches to quality improvement and the application of the baic quality tools to improve processes is covered.	Trace history of quality to the contemporary quality issues	1a,1b,1d,1c,4a		IET 240/364	TBD: An elective for quality certificate. Not immediately on schedule of assessment plans.			
	State characteristics of major quality philosophies							
	State Deming's 14 points and other major quality concepts							
	Statek, sketch and apply the 7 basic quality tools							
	Ability to apply and compare general internal and external audit, Baldridge, ISO 9000, QS-9000 concept to actual situations							
	Can describe internal and external customer's needs in terms of contemporary quality concepts							
	Apply quality philosophy to supplier relationships							
	Analyze, summarize an dmake recommendations of quality concepts using quality philosophy, 7 tools, auditing techniques, and quality training concepts to contemporary cases.							
	Relate JIT, cycle times, and response times to quality management							
	Apply economics of quality to quality management							
	Apply the concepts and principles of quality using cases with appropriate analysis.							
By the end of the class, the student should have an overall understanding of not only how a typical manufacturing company operates, but how to contribute to making the operation more efficient and more productive for the future.	To learn generic functions of all facets of a manufacturing organization including financial, marketing, human resources, quality, material flow, manufacturing cost control, manufacturing systems, engineering, and the manufacturing environment.	1b,1d		IET 104	Final Project	70% successfully complete project per Rubrik	Yes	As/BS MET CGT
	Apply learning to business plan development of student's choice. Application will develop throughout the entire course as development for final project.	1a,1e,2c,2e						
	Upon completion of a course, a student should be able to assess all aspects of an organization.	4a						

General Course Objective	Measurable Outcomes	Related PUL	Related ABET a-k	Course	Method of Assessment	Goal	Goal Met?	Degree Program
By the end of the class, the student should be able to apply statistical techniques to typical problems in technology. Topics include: data collection, descriptive statistics calculation, hypothesis testing, sampling, continuous and discrete distribution, probability, ANOVA and related topics. This course also introduces the student to the use of spreadsheet and other statistical software.	Ability to graphically summarize data	1a		IET 150	Final exam, case studies	70% successfully completed	Yes	many
	Calculate means, medians, modes	1d						
	Calculate variance and standard deviation statistics	1d						
	Know the difference between population and sample statistics and parameters	1b,d						
	Know when to use and be apply to apply discrete distribution	1b,d						
	Know when to use and be apply to apply continuous distributions	1b,d						
	Know when to use Student's t distribution and Chi square distribution	1b,d						
	Be able to work in a group, analyze a case, organize the data, draw conclusions with appropriate statistical application, and present to a group of peers.	1a,1c,2d,4a						
	Master the ability to use the accounting equation to develop balance sheets, income statements and appropriate performance ratios based upon a variety of financial journal entries			IET 350	Graduation Exam	70% average score	No	Many
	Ability to analyze personal financial investments and financial priorities							
	Understand interest calculations and compounding of interest							
	Understand annuities, gradients and time value of money							
	Understand the methodology behind continuous financial improvement and the cost of quality							
	Understand the variety of ways to calculate return on investment for different projects and situations							
	Demonstrate sound judgement in engineering project decision making based upon time value of money calculations							

DEPARTMENT OF ORGANIZATIONAL LEADERSHIP AND SUPERVISION 2002 ASSESSMENT ANNUAL REPORT

Prepared by Tim Diemer, Cliff Goodwin, and the Faculty of the Department

17-May-02

Assessment of the A.S. Degree on OLS

1	2	3a	3b	4	5	6
What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and chan have you made based on assessr findings?
1.Core Communication and Quantitative Skills: The ability of students to write, read, speak and listen, perform quantitative analysis, and use information resources and technology--the foundation skills necessary for all IUPUI students to succeed.	(a) to express ideas and facts to others effectively in a variety of written formats,	100, 252, 263, 274, 331, 327, 378, 390	Term papers. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations. Exams. Movie Reaction Paper (Animal Farm and Platoon), Personal Ethics Reaction Plan(10 page paper containing personal mission statement, life balance goals, current issues and a leadership plan for dealing with those issues)	Exam scores. Response to written assignments. Observation of group discussion. Notes and reports from group discussions and group projects. Student-developed scoring rubrics	Develop new scoring rubrics; increase the use of objective criteria for scoring of writing assignments.	Increase in the number of assignments that include precise evaluation criteria as part of the assignment description.
	(b) to comprehend, interpret, and analyze texts,	252, 263, 274, 327, 378, 390	Term papers. Case studies. Group negotiation exercises. Exams.	Require use of textbook concepts in a variety of written formats. Provide discussion topics that require use of textbook concepts.	Shortcoming in documentation in 35% term papers.	Review APA style documentatic Provide Web references.
	(c) to communicate orally in one-on-one and group settings,	252, 263, 274, 331, 378, 390	Group negotiation exercises. Guided discussion. Group Class Facilitation	Analysis of notes from group discussions. Student-developed scoring rubrics	Newly introduced technical difficulties with Oncourse have hampered effectiveness of online courses.	Need to adjust online classes to work around technical problems with Oncourse chat room, bullet board, and grade book.
					75% of interview assignments resulted in relevant data. 75% of term papers made effective use of textbook concepts.	
				Survey of student satisfaction with online classes.	Student-created assessment rubrics provide a clearer target for students, they know exactly what the assignment is seeking, because they	Improve the instructions for this assignment. Include detailed instructions for effective intervie Specify relevant sections of the
	(d) to solve problems that are quantitative in nature,	274, 327	Group negotiation exercises.	Analyze data from charts and graphs. Tests, writing assignments.	Emphasize the importance of informing students how assignments will be graded.	Development of more precise scoring rubrics.
	(e) to make efficient use of information resources and technology for personal and professional needs.	274, 263, 378, 390	Find information on World Wide Web; use short-essay format to show connection to textbook concepts. Participate in group chat sessions, making use of assigned Web pages and textbook references. Within the chat-room discussion format, resolve issues presented in case studies.	Scoring rubrics for written assignments	Emphasize the importance of establishing objective criteria for scoring participation in class discussions. Our department is lacking in means of authentic assessment and portfolio assessment should be created to address this issue.	Under advisement. Received an internal grant from the School of to develop portfolio assessment program for all ET students.
			Leadership paper. Students provide their personal philosophy for leadership.	Philosophy of leadership paper. (5 pages, 5 references using APA or MLA style.)	Provide a sample paper showing APA and MLA style for referencing.	

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and chan have you made based on assessr findings?
			Term papers.		Multiple choice testing was not producing the depth of critical analysis required for demonstration of competency in the management topics of OLS 274.	New written knowledge assessm and an accompanying rubric wer developed. Students in OLS 274 improved their ability to produc well written concise answer reflecting their mastery of the co content.
2. Critical Thinking: The ability of students to analyze carefully and logically information and ideas from multiple perspectives.	(a) to analyze complex issues and make informed decisions	252, 263, 274, 331, 327, 375, 378, 390	Case studies. Group negotiation exercises. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations. Exams. Interviews with area leaders and interview reports.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	70% of students were able to identify and clearly describe connections between textbook models / concepts and a secondary source.	Need for greater practice "...to synthesize information in order t arrive at reasoned conclusion."
	(b) to synthesize information in order to arrive at reasoned conclusions	252, 263, 274, 331, 327, 378, 390	Case studies. 5-page statement of personal philosophy on labor-management relations. Group negotiation exercises. Exams. Written interview of a manager or supervisor.	Require students to fit information from a secondary source into a textbook model. Require students to study a secondary source and identify the connections to textbook concepts.	On a term paper assignment, 66% of students showed strong performance in, "The ability of students to analyze carefully and logically information and ideas from multiple perspectives."	New instructions, more structure this assignment.
	(c) to evaluate the logic, validity, and relevance of data	252, 263, 327, 378, 390	Case studies. Group negotiation exercises.	Require students to complete interview and job shadowing experience reports detailing their experiences and connecting those experiences with theory from text.		
	(d) to solve challenging problems	252, 263, 274, 331, 327, 378, 390	Case studies. Group negotiation exercises. Job Shadowing and experience reports.	Applied exams using case studies to prompt answers.		
	(e) to use knowledge and understanding in order to generate and explore new questions	252, 263, 274, 331, 327, 390	Case studies.	Analyze a case study pertinent to concepts covered in course.	75% of students were able to apply course concepts to assigned case study.	Addition of a more complex cas into OLS 375 to include evaluati level of cognitive complexity.
				Require students to select and interview a working manager or supervisor using questions developed by the student's classroom group.	Students were able to collectively identify a series of questions related to management topics and conduct an effective interview with the interviewee.	Students will receive an example a completed interview to use as a template for their write-up.
3. Integration and Application of Knowledge: The ability of students to use information and concepts from studies in multiple disciplines in their intellectual, professional, and community lives.	(a) to enhance their personal lives; (b) to meet professional standards and competencies; (c) to further the goals of society	252, 263, 274, 331, 327, 378, 390	Letters to public officials about current issues.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	75% of groups in online classes are able to successfully complete the virtual group project	Need to adjust assignment requirement to compensation for technical limitations of online classes.

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and chan have you made based on assessr findings?
			Students create PEAP, Personal Ethics Action Plan	Students will meet basic competency as per the PEAP scoring rubric developed by instructor and students.	Findings indicate 80% of students are meeting competency requirements. Those that do not are chronically absent. I make phone calls each week to students who	
			Analysis of job related interviews conducted with working managers and supervisors.	Group presentation regarding the information gathered and individual write-ups on the interview results.	Student groups were able to identify and clearly describe connections between textbook models / concepts and their interviewees point of reference.	Need for more specific instructi regarding appropriate interview topics and consolidation of grou information.
4. Intellectual Depth, Breadth, and Adaptiveness: The ability of students to examine and organize disciplinary ways of knowing and to apply them to specific issues and problems.	(a) Intellectual depth describes the demonstration of substantial knowledge and understanding of at least one field of study	100, 263, 274, 327, 378, 390	Students conduct structured interview with faculty in technology department in order to identify technology concentration.	Structured interview summary sheet.	Individual students require interview time from faculty - takes up too much of their time.	Have group interviews with facu rather than individual interviews
	(b) intellectual breadth is demonstrated by the ability to compare and contrast approaches to knowledge in different disciplines	263, 378, 390	Students in OLS 263 use case studies and articles in a large variety of disciplines (diversity issues, gender issues, environmental issues, etc).	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	15% of term papers indicated superficial analysis of cultural dimensions.	Increase contact with people of differing cultures. Require interviews, increase the number guest speakers.
	(c) adaptiveness is demonstrated by the ability to modify one's approach to an issue or problem based on the contexts and requirements of particular situations	252, 263, 331, 327, 378, 390	Group negotiation exercises.	Scoring rubrics, analysis of group discussions, observation, scoring rubrics for PEAP, Movie Reaction Papers and Class Facilitation.		
			Students should demonstrate their adaptiveness to specific situations through a comparative discussion of the various management philosophies uncovered by their interviews.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	Many papers indicated a lack of comprehensive analysis and consideration of application to textbook concepts.	Students will participate in in-cl analysis of case study interviews develop analytical skills.

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and chan have you made based on assessr findings?
5. Understanding Society and Culture: The ability of students to recognize their own cultural traditions and to understand and appreciate the diversity of the human experience, both within the United States and internationally.	(a) to compare and contrast the range of diversity and universality in human history, societies, and ways of life	263, 252, 327, 378, 390	Case studies. Class discussions, interviews.	Scoring rubrics for term papers and term projects.	Given a scale of cultural dimensions, 75% of students are able to describe the characteristics of the culture of middle America.	
	(b) to analyze and understand the interconnectedness of global and local concerns	263, 327, 378, 390	Case studies. Letters to public officials about current issues.	Interview and job shadowing reports.	75% of students are able to compare a differing culture to American culture, using a scale of cultural	
	(c) to operate with civility in a complex social world	252, 263, 327, 378, 390	Case studies. Group negotiation exercises.		100% of students are able to describe and discuss the importance/impact of the global issues on organizations in the USA. Students do this through written and oral assignments such as the PEAP, Leadership Interview, Job Shadowing, class discussion and	
6. Values and Ethics: The ability of students to make judgments with respect to individual conduct, citizenship, and aesthetics	(a) to make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices (b) to recognize the importance of aesthetics in their personal lives and to society	252, 274, 331, 327, 378, 390	Group negotiation exercises. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations.			
			Interview of working professional.	Using the response of interviewees to specific scenarios designed to elicit ethical dilemmas in business.	The students were unclear regarding the requirements to discuss their interviewees responses to ethical situations typically faced in their work environment.	The assignment with be written greater clarity to avoid placing tl student in an ambiguous situatio regarding the interview requirements.

Assessment of the B.S. Degree in OLS

1	2	3a	3b	4	5	6
What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and changes have you made based on assessme findings?
1.Core Communication and Quantitative Skills: The ability of students to write, read, speak and listen, perform quantitative analysis, and use information resources and technology--the foundation skills necessary for all IUPUI students to succeed.	(a) to express ideas and facts to others effectively in a variety of written formats,	100, 252, 263, 274, 331, 327, 378, 390, 410, 490	Term papers. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations. Exams. Movie Reaction Paper (Animal Farm and Platoon), Personal Ethics Reaction Plan(10 page paper containing personal mission statement, life balance goals, current issues and a leadership plan for dealing with those issues)	Exam scores. Response to written assignments. Observation of group discussion. Notes and reports from group discussions and group projects. Student-developed scoring rubrics	Develop new scoring rubrics; increase the use of objective criteria for scoring of writing assignments.	Increase in the number of assignmen that include precise evaluation criteri as part of the assignment description.
	(b) to comprehend, interpret, and analyze texts,	252, 263, 274, 327, 378, 390, 410, 490	Term papers. Case studies. Group negotiation exercises. Exams.	Require use of textbook concepts in a variety of written formats. Provide discussion topics that require use of textbook concepts.	Shortcoming in documentation in 35% term papers.	Review APA style documentation. Provide Web references.
	(c) to communicate orally in one-on-one and group settings,	252, 263, 274, 331, 378, 390, 410, 490	Group negotiation exercises. Guided discussion. Group Class Facilitation	Analysis of notes from group discussions. Student-developed scoring rubrics	Newly introduced technical difficulties with Oncourse have hampered effectiveness of online courses. 75% of interview assignments resulted in relevant data. 75% of term papers made effective use of textbook concepts.	Need to adjust online classes to work around technical problems with Oncourse chat room, bulletin board, grade book.
				Survey of student satisfaction with online classes.	Student-created assessment rubrics provide a clearer target for students, they know exactly what the assignment is seeking, because they	Improve the instructions for this assignment. Include detailed instructions for effective interviews. Specify relevant sections of the
	(d) to solve problems that are quantitative in nature,	274, 327	Group negotiation exercises.	Analyze data from charts and graphs. Tests, writing assignments.	Emphasize the importance of informing students how assignments will be graded.	Development of more precise scorin rubrics.
	(e) to make efficient use of information resources and technology for personal and professional needs.	274, 263, 378, 390, 490	Find information on World Wide Web; use short-essay format to show connection to textbook concepts. Participate in group chat sessions, making use of assigned Web pages and textbook references. Within the chat-room discussion format, resolve issues presented in case studies.	Scoring rubrics for written assignments	Emphasize the importance of establishing objective criteria for scoring participation in class discussions. Our department is lacking in means of authentic assessment and portfolio assessment should be created to address this issue.	Under advisement. Received an inter grant from the School of ET to devel portfolio assessment pilot program fo all ET students.
			Leadership paper. Students provide their personal philosophy for leadership.	Philosophy of leadership paper. (5 pages, 5 references using APA or MLA style.)	Provide a sample paper showing APA and MLA style for referencing.	

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and changes have you made based on assessme findings?
			Term papers.		Multiple choice testing was not producing the depth of critical analysis required for demonstration of competency in the management topics of OLS 274.	New written knowledge assessments and an accompanying rubric were developed. Students in OLS 274 improved their ability to produce a w written concise answer reflecting the mastery of the course content.
2. Critical Thinking: The ability of students to analyze carefully and logically information and ideas from multiple perspectives.	(a) to analyze complex issues and make informed decisions	252, 263, 274, 331, 327, 375, 378, 390, 410, 490	Case studies. Group negotiation exercises. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations. Exams. Interviews with area leaders and interview reports.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	70% of students were able to identify and clearly describe connections between textbook models / concepts and a secondary source.	Need for greater practice "...to synthesize information in order to arı at reasoned conclusion."
	(b) to synthesize information in order to arrive at reasoned conclusions	252, 263, 274, 331, 327, 378, 390, 410, 490	Case studies. 5-page statement of personal philosophy on labor-management relations. Group negotiation exercises. Exams. Written interview of a manager or supervisor.	Require students to fit information from a secondary source into a textbook model. Require students to study a secondary source and identify the connections to	On a term paper assignment, 66% of students showed strong performance in, "The ability of students to analyze carefully and logically information and ideas from multiple perspectives."	New instructions, more structure for assignment.
	(c) to evaluate the logic, validity, and relevance of data	252, 263, 327, 378, 390, 410, 490	Case studies. Group negotiation exercises.	Require students to complete interview and job shadowing experience reports detailing their experiences and connecting		
	(d) to solve challenging problems	252, 263, 274, 331, 327, 378, 390, 490	Case studies. Group negotiation exercises. Job Shadowing and experience reports.	Applied exams using case studies to prompt answers.		
	(e) to use knowledge and understanding in order to generate and explore new questions	252, 263, 274, 331, 327, 390, 410, 490	Case studies.	Analyze a case study pertinent to concepts covered in course.	75% of students were able to apply course concepts to assigned case study.	Addition of a more complex case int OLS 375 to include evaluation level cognitive complexity.
				Require students to select and interview a working manager or supervisor using questions developed by the student's classroom group.	Students were able to collectively identify a series of questions related to management topics and conduct an effective interview with the interviewee.	Students will receive an example of a completed interview to use as a temp for their write-up.
3. Integration and Application of Knowledge: The ability of students to use information and concepts from studies in multiple disciplines in their intellectual, professional, and community lives.	(a) to enhance their personal lives; (b) to meet professional standards and competencies; (c) to further the goals of society	252, 263, 274, 331, 327, 378, 390, 490	Letters to public officials about current issues.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	75% of groups in online classes are able to successfully complete the virtual group project	Need to adjust assignment requireme to compensation for technical limitations of online classes.

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and changes have you made based on assessmer findings?
			Students create PEAP, Personal Ethics Action Plan	Students will meet basic competency as per the PEAP scoring rubric developed by instructor and students.	Findings indicate 80% of students are meeting competency requirements. Those that do not are chronically absent. I make phone calls each week to students who have been absent.	
			Analysis of job related interviews conducted with working managers and supervisors.	Group presentation regarding the information gathered and individual write-ups on the interview results.	Student groups were able to identify and clearly describe connections between textbook models / concepts and their interviewees point of reference.	Need for more specific instruction regarding appropriate interview topic and consolidation of group informati
4. Intellectual Depth, Breadth, and Adaptiveness: The ability of students to examine and organize disciplinary ways of knowing and to apply them to specific issues and problems.	(a) Intellectual depth describes the demonstration of substantial knowledge and understanding of at least one field of study	100, 263, 274, 327, 378, 390, 490	Students conduct structured interview with faculty in technology department in order to identify technology concentration.	Structured interview summary sheet.	Individual students require interview time from faculty - takes up too much of their time.	Have group interviews with faculty rather than individual interviews.
	(b) intellectual breadth is demonstrated by the ability to compare and contrast approaches to knowledge in different disciplines	263, 378, 390, 410, 490	Students in OLS 263 use case studies and articles in a large variety of disciplines (diversity issues, gender issues, environmental issues, etc).	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	15% of term papers indicated superficial analysis of cultural dimensions.	Increase contact with people of diffe cultures. Require interviews, increas the number of guest speakers.
	(c) adaptiveness is demonstrated by the ability to modify one's approach to an issue or problem based on the contexts and	252, 263, 331, 327, 378, 390, 410	Group negotiation exercises.	Scoring rubrics, analysis of group discussions, observation, scoring rubrics for PEAP, Movie Reaction Papers and Class		
			Students should demonstrate their adaptiveness to specific situations through a comparative discussion of the various management philosophies uncovered by their interviews.	Analyze results of group discussions and group projects. Scoring rubrics for term papers and term projects.	Many papers indicated a lack of comprehensive analysis and consideration of application to textbook concepts.	Students will participate in in-class analysis of case study interviews to develop analytical skills.
5. Understanding Society and Culture: The ability of students to recognize their own cultural traditions and to understand and appreciate the diversity of the human experience, both within the United States and internationally.	(a) to compare and contrast the range of diversity and universality in human history, societies, and ways of life	263, 252, 327, 378, 390	Case studies. Class discussions, interviews.	Scoring rubrics for term papers and term projects.	Given a scale of cultural dimensions, 75% of students are able to describe the characteristics of the culture of middle America.	
	(b) to analyze and understand the interconnectedness of global and local concerns	263, 327, 378, 390	Case studies. Letters to public officials about current issues.	Interview and job shadowing reports.	75% of students are able to compare a differing culture to American culture, using a scale of cultural dimensions.	

What general outcomes are you seeking?	Measurable outcomes: What will the student know or be able to do? These are your	Where will your students learn it?	Methods	How do you measure each of the desired behaviors listed in column 2?	What are findings in assessing general outcomes (column 1)?	What improvements (and changes have you made based on assessme findings?
	(c) to operate with civility in a complex social world	252, 263, 327, 378, 390, 410	Case studies. Group negotiation exercises.		100% of students are able to describe and discuss the importance/impact of the global issues on organizations in the USA. Students do this through written and oral assignments such as the PEAP, Leadership Interview, Job Shadowing, class discussion and case	
6. Values and Ethics: The ability of students to make judgments with respect to individual conduct, citizenship, and aesthetics	(a) to make informed and principled choices regarding conflicting situations in their personal and public lives and to foresee the consequences of these choices (b) to recognize the importance of aesthetics in their personal lives and to society	252, 274, 331, 327, 378, 390, 410, 490	Group negotiation exercises. Letters to public officials about current issues. 5-page statement of personal philosophy on labor-management relations. Interview of working professional.	Using the response of interviewees to specific scenarios designed to elicit ethical dilemmas in business.	The students were unclear regarding the requirements to discuss their interviewees responses to ethical situations typically faced in their work environment.	The assignment with be written with greater clarity to avoid placing the student in an ambiguous situation regarding the interview requirements

2001-2002 GRADUATE ASSESSMENT IN THE SCHOOL OF ENGINEERING AND TECHNOLOGY

History

An ad hoc committee for the assessment of student learning at the graduate level in the Purdue School of Engineering and Technology was form in the fall semester of 2000 under the leadership of Dr. Nasser Paydar, Associate Dean. The committee membership includes Russell Eberhart, Maher Rizkalla, and Charles Yokomoto from the Department of Electrical and Computer Engineering (ECE), Hasan Akay and Jie Chen from the Department of Mechanical Engineering (ME), and Edward Berbari from the Bioengineering program. While some of the members also serve on the E&T Assessment Committee, which focuses on undergraduate assessment, the two committees operate fairly independently of each other.

Assessment Process

After several meetings of the ad hoc graduate assessment committee, the three programs developed a process for assessing student learning. At this time, the process only considers the assessment of master's theses and course projects. A flowchart of this is shown in Appendix A. In the future, the process will be expanded to include other assessment methods such as a survey of alumni, a survey of employers, and surveys of continuing students that parallel the assessment process used in the undergraduate programs. However, since the university focuses on the Principles of Undergraduate Learning and since professional accreditation of undergraduates, the committee decided that the assessment resources of the departments involved should be spend more on undergraduate assessment.

The decision to use the assessment of masters theses and course projects was based on a paper by Patricia D. Murphy, "Assessing Student Learning in Graduate Programs," where she mentions the assessment of dissertations, theses, scientific papers, or comprehensive study papers as one of the ways that faculty at 40 masters programs were using. Since this method was being used to assess student learning in the undergraduate programs, the committee was able to develop scoring rubrics very quickly by adapting the undergraduate capstone project rubric to the assessment of master's course project reports and theses.

Scoring Rubrics for Master's Thesis Research and Master's Course Projects

After the graduate assessment committee completed its work on the flowchart of its process, its members worked on developing scoring rubrics for master's thesis research and course projects. The actual rubrics are attaches as Appendix B and Appendix C, respectively. For thesis research, the faculty agreed to assess the following:

- **Problem Identification:** The quality of the written description of the problem investigated
- **Literature Survey:** The quality of the literature survey conducted for the thesis or project
- **Creativity:** The degree which creativity was demonstrated in the solution of the problem
- **Use of Engineering Principles:** The soundness of the engineering principles used and understood

- **Research Quality:** The quality of the investigative research demonstrated by the student
- **Collection, Analysis, and Interpretation of the Data:** The completeness and quality of the data collection, analysis and interpretation of the data
- **Completeness of the Research:** The degree of completeness of the research work
- **Effectiveness of the Written Report:** The overall effectiveness of the written report
- **Effectiveness of the Oral Presentation:** The overall effectiveness of the student's oral presentation of his/her work

For master's course projects, the items to be assessed are the following:

- **Problem Identification:** The quality of the written description of the problem investigated
- **Creativity:** The degree of creativity demonstrated
- **Methodology:** The effectiveness of the methodology used
- **Use of Engineering Principles:** The soundness of the engineering principles used and understood
- **Completeness:** The degree of completeness of the project work and quality of the methods used
- **Effectiveness of the Written Report:** The overall effectiveness of the written report
- **Effectiveness of the Oral Presentation:** The overall effectiveness of the student's oral presentation of his/her work

Using the Scoring Rubrics

Projects and theses are assessed through a combination of reading the printed work and listening to an oral presentation. In the ideal, more than one person assesses each project or thesis. In order to achieve some degree of inter-rater reliability, the faculty have agreed to use a the following scale:

5 = Excellent
4 = Very Good
3 = Good
2 = Fair
1 = Poor

While further enhancement of inter-rater reliability could be obtained by defining the terms "excellent," "very good," etc., the faculty felt that these terms were sufficient since faculty already have a general understanding of them.

The faculty decided that a score of 3.5 or better on a scored item indicated that the item was satisfied. This particular number was chosen because it rests midway between Very Good and Good.

Results from the 2001-2002 Academic Year

To date, only the Mechanical Engineering Department has submitted data from the assessment of master's theses and master's course projects. Table 1 below is a summary of the assessment of master's thesis research in the Department of Mechanical Engineering. As shown in the table, four students were assessed with multiple raters. While a particular student may

have scored below 3.5 on a particular item, the Overall Avg column demonstrates that the average across all four students met the desired goal of 3.5/5.0 on each item. The average score on all items fell between 3.8 and 4.2.

Improvements needed or planned at this time: none

Table 1. Assessment of Masters Theses in the ME Department

ITEMS FOR MASTER'S THESIS ASSESSMENT IN THE ME DEPARTMENT	Student #1 Average Scores (4 reviewers)	Student #2 Average Scores (4 reviewers)	Student #3 Average Scores (3 reviewers)	Student #4 Average Scores (3 reviewers)	Overall Average	Goal Met?
1. Problem Identification: The quality of the written description of the problem investigated	**4.5**	**4.0**	**3.0**	**3.7**	**3.8**	**Yes**
2. Literature Survey: The quality of the literature survey conducted for the thesis or project	**4.0**	**4.3**	**3.7**	**3.7**	**3.9**	**Yes**
3. Creativity: The degree which creativity was demonstrated in the solution of the problem	**3.0**	**4.3**	**4.0**	**3.7**	**3.8**	**Yes**
4. Use of Engineering Principles: The soundness of the engineering principles used and understood	**4.0**	**4.3**	**4.3**	**3.7**	**4.1**	**Yes**
5. Research Quality: The quality of the investigative research demonstrated by the student	**3.8**	**5.0**	**4.3**	**3.7**	**4.2**	**Yes**
6. Collection, Analysis, and Interpretation of the Data: The completeness and quality of the data collection, analysis and interpretation of the data	**3.8**	**4.3**	**4.0**	**3.0**	**3.8**	**Yes**
7. Completeness of the Research: The degree of completeness of the research work	**3.8**	**4.5**	**4.0**	**3.3**	**3.9**	**Yes**
8. Effectiveness of the Written Report: The overall effectiveness of the written report	**4.0**	**3.5**	**3.7**	**4.3**	**3.9**	**Yes**
9. Effectiveness of the Oral Presentation: The overall effectiveness of the student's oral presentation of his/her work	**4.0**	**3.5**	**3.7**	**4.3**	**3.9**	**Yes**

Table 2 shows the results for the assessment of master's course projects for the 2001-2002 academic years. As shown in the table, three students were assessed with multiple raters. While a particular student may have scored below 3.5 on a particular item, the Overall Avg column demonstrates that the average across all three students met the desired goal of 3.5/5.0 on each item. The average score on all items fell between 3.6 and 4.3. The item with the lowest score is Creativity (3.6). While this item barely meets the minimum score of 3.5, the faculty feel that creativity is an item of lesser importance since projects are aimed toward application and not research.

Improvements needed or planned at this time: none

Table 2. Assessment of Masters Course Projects in the ME Department

ITEMS FOR MASTER'S COURSE PROJECT ASSESSMENT IN THE ME DEPARTMENT	Student #1 Average Scores (2 reviewers)	Student #2 Average Scores (2 reviewers)	Student #3 Average Scores (5 reviewers)	Overall Avg	Goal Met?
1. Problem Identification: The quality of the written description of the problem investigated	4.0	4.0	4.8	**4.3**	**Yes**
2. Creativity: The degree which creativity was demonstrated	3.0	3.5	4.4	**3.6**	**Yes**
3. Methodology: The effectiveness of the methodology used	4.0	4.0	4.8	**4.3**	**Yes**
4. Use of Engineering Principles: The soundness of the engineering principles used and understood	3.5	4.0	4.6	**4.0**	**Yes**
5. Completeness: The degree of completeness of the project work and the quality of the methods used.	4.0	4.5	4.4	**4.3**	**Yes**
6. Effectiveness of the Written Report: The overall effectiveness of the written report	4.0	4.0	3.5	**3.8**	**Yes**
7. Effectiveness of the Oral Presentation: The overall effectiveness of the student's oral presentation of his/her work.	4.5	3.5	4.8	**4.3**	**Yes**

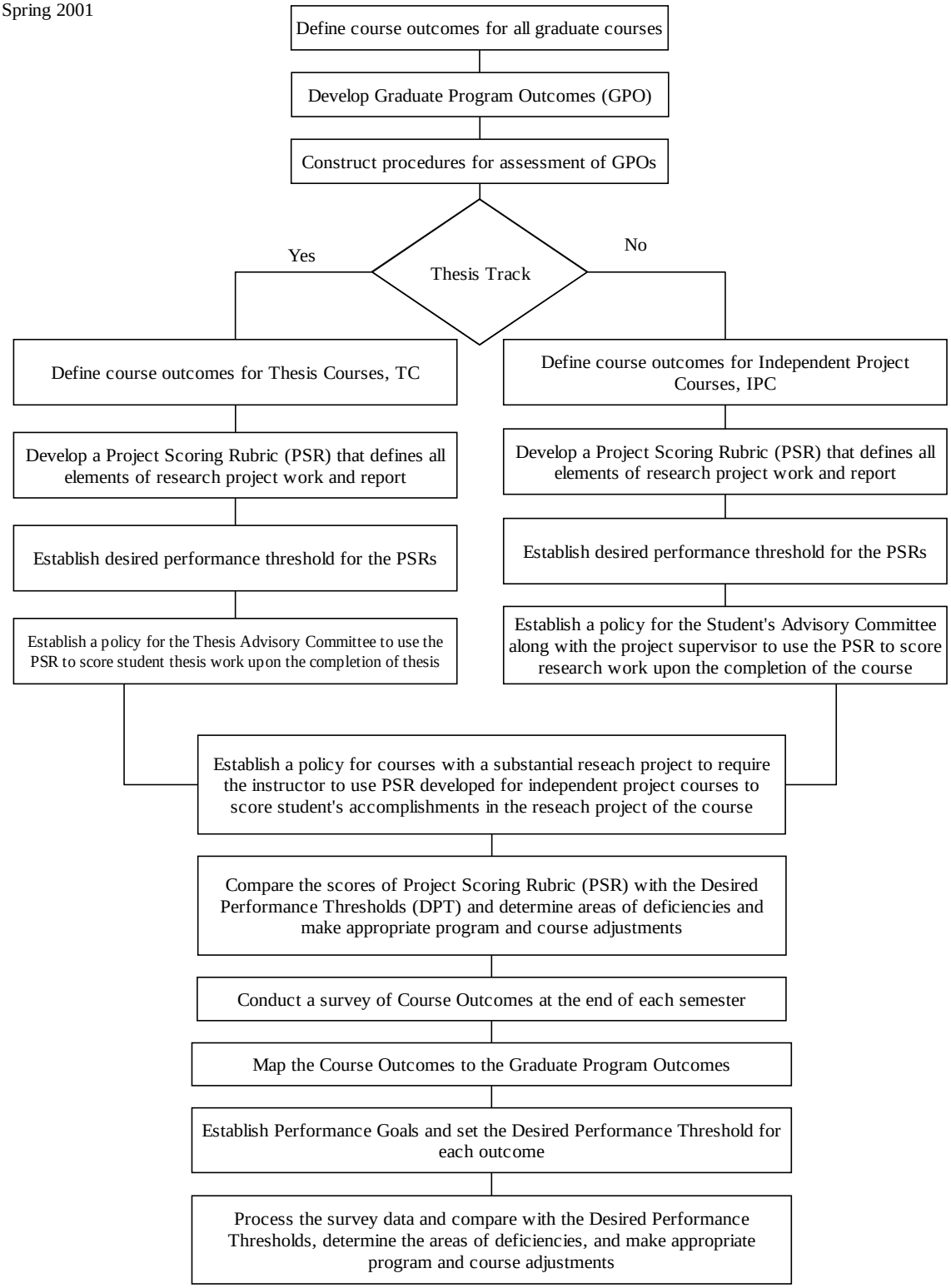
Further Assessment Activities

Further work in graduate assessment include the following:

- Assessment of master's theses and master's course projects in Electrical and Computer Engineering and Biomedical Engineering
- Assessment of student learning through self-reports of student with regard to the course learning outcomes written for graduate courses.

APPENDIX A: FLOW CHART FOR ASSESSING THESES AND PROJECTS

School of Engineering and Technology
GraduateProgram Assessment Protocol
Spring 2001



APPENDIX B: RUBRIC FOR SCORING MASTERS THESES RESEARCH COURSES

1. **Problem Identification:** The quality of the written description of the problem investigated
   1 2 3 4 5

2. **Literature Survey:** The quality of the literature survey conducted for the thesis or project
   1 2 3 4 5

3. **Creativity:** The degree which creativity was demonstrated in the solution of the problem
   1 2 3 4 5

4. **Use of Engineering Principles:** The soundness of the engineering principles used and understood
   1 2 3 4 5

5. **Research Quality:** The quality of the investigative research demonstrated by the student
   1 2 3 4 5

6. **Collection, Analysis, and Interpretation of the Data:** The completeness and quality of the data collection, analysis and interpretation of the data
   1 2 3 4 5

7. **Completeness of the Research:** The degree of completeness of the research work
   1 2 3 4 5

8. **Effectiveness of the Written Report:** The overall effectiveness of the written report
   1 2 3 4 5

9. **Effectiveness of the Oral Presentation:** The overall effectiveness of the student's oral presentation of his/her work
   1 2 3 4 5

Notes:

1. All items will be scored from 1 through 5, with 1 = Poor, 2 = Fair, 3= Good, 4 = Very good, 5 = Excellent). No partial scores will be granted.
2. The Advisory Committee will conduct scoring after the presentation and the final version of the report.
3. Additional members may be invited for scoring at the discretion of the Committee.
4. The anonymity of the thesis student and supervisor(s) will be maintained in the surveys.

APPENDIX C: RUBRIC FOR SCORING MASTERS COURSE PROJECTS

1. **Problem Identification:** The quality of the written description of the problem investigated

   1 2 3 4 5

2. **Creativity:** The degree of creativity demonstrated

   1 2 3 4 5

3. **Methodology:** The effectiveness of the methodology used

   1 2 3 4 5

4. **Use of Engineering Principles:** The soundness of the engineering principles used and understood

   1 2 3 4 5

5. **Completeness:** The degree of completeness of the project work and quality of the methods used

   1 2 3 4 5

6. **Effectiveness of the Written Report:** The overall effectiveness of the written report

   1 2 3 4 5

7. **Effectiveness of the Oral Presentation:** The overall effectiveness of the student's oral presentation of his/her work

   1 2 3 4 5

Notes:

1. All items will be scored from 1 through 5, with 1 = Poor, 2 = Fair, 3= Good, 4 = Very good, 5 = Excellent). No partial scores will be granted.
2. The Advisory Committee will conduct scoring after the presentation and the final version of the report.
3. Additional members may be invited for scoring at the discretion of the Committee.
4. The anonymity of the student and the supervisor(s) will be maintained in the surveys.